

Fire Research Advance and Technology Transfer in China

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Abstract: Owing to natural and historical factors, forest fires have been long frequenting in China. Forest fire research starts forest fire research in the 1950s and the May 6th, 1987, Forest Fire of Daxinganling mountain area is a critical point in the history of forest fire research in China. Researchers have made some progress in predicting and forecasting the forest fire causing weather, the cause of fire and fire behavior. Some works have been done in the planned fire burning either inside or outside the forest. Monitoring system is composed of the application of Meteorological satellites in monitoring and predicting forest fire and the application of distance satellites for emergency in communication. We have worked out a series of products for the professional fire fighters, portable fire ignition and fire distinguishing tools and equipment designed. The Green-breaks belts in the south have taken their good effects. They have shown great potential for further development. Both planting and management of the trees should become many-faceted. In general forest fire study both at theoretical level and practical level, is mainly focused on the north part of the country while in other areas especially in the south and southwest areas has a relatively short history and backward. It has a good future for China on forest fire research.

Keywords: Forest Fire, Research, Fire Fighting, Fire Prevention, Fire Extinguish

Introduction

It starts forest fire research in the 1950s and the May 5th Forest Fire of Daxinganling mountain area is a critical point in the history of forest fire research in China. To solve a series of problems of technology and method met in fighting against the May 5th Forest Fire, our government set up the project as a funded program in forest fire prevention and protection-- a study of forest fire prevention and protection in Daxinganling mountain area. The study consists of -- the study of prediction and forecast technology of the weather liable to cause fire, of forest fire behavior and fire blockage technology, of management of fire fighting, of fire distinguishing outfit and fire fighting equipments for emergency, and of field experiment. In general our study both at theoretical level and practical level, is mainly focused on the north part of the country while in other areas especially in the south and southwest areas including Yunan, Sichuan, Hainan, Guangdong, Guangxi, Guizhou and Fujian provinces where forest fires have been found frequently, the study of forest fire has a relatively short history and backward. So here we can say that there is an obvious imbalance of the study as far as the whole country is concerned.

The major research progresses of recent years:

? The forecast of forest fire and forest fire prevention

We have made some progress in predicting and forecasting the forest fire causing weather, the cause of fire and fire behavior. What's more we have set up a system to forecast and prevent the forest fire behavior and put forward new theories and methods about the cause and behavior of the forest fire. But we have found that these theories and methods are hard to put into practice.

? The study of forest fire blocking techniques.

We have done some work in the planned fire burning either inside or outside the forest. We have put forward the technology of geological and climate ignition, and compiled for the

Northeast and inner Mongolian forest areas the procedure of using the planned fire, which has been widely adopted in the two areas.

? Forest fire monitoring and information transmission

This system is composed of the application of NOAA satellites in monitoring and predicting forest fire and the application of distance satellites for emergency in communication.

? Equipments for Fire fighters

We have worked out a series of products for the professional fire fighters, portable fire ignition and fire distinguishing tools and equipment designed exclusively for the fire fighting force such as the products in alarming, lighting, charging, communicating, commanding and cooking etc. All these products play their parts in fire fighting.

? Equipments for fire fighting

The model Squerral helicopter equipped with a fire distinguishing bucket, the model Mic 8 helicopter with its outside equipped with a fire extinguishing automaton, and the model 5 with water to fight fire contribute much to the development of the forest fire protection by air. On the other hand, portable wind powered fire extinguishing series have been widely used in fire fighting. For instance the tire style fire engine and the wheel style field fire engine both have improved the effect of fire fighting on land.

? Green-breaks belts

The Green-breaks belts in the south have shown their good effects. They have shown great potential for further development. Here we suggest that the study of the mechanism of the Green-breaks belts should be shifted from the qualitative to the quantitative, the trees planted should be of different type rather than of a single type, should be in a complex structure rather than in a simple structure. Both planting and management of the trees should become many-faceted.

The roles of forest fire research in fire protection

The research contributes to the fire fighting in the past years in the following aspects.

? It makes fire fighters further understand the nature of the forest fire. In the past they thought their job was only to put out it once there is a fire, but now they have realized that it is more important than putting out the fire that they need to learn to manage the forest and then the fire. It shows that we have changed our strategy of fire fighting.

? It improves the technology of forest fire forecast. Though we haven't set up a fire forecast system around the whole country, we have started doing it in some areas of the country. And we have moved into a new stage of fire behavior prediction rather than the past metreological prediction of fire danger.

? It raises the level of fire monitoring.

We have successfully built a network of fire monitoring through out the country. The network now has shown it significant effects. Plane's x-ray monitoring technology has been fully and widely adopted.

? It improves the communication in fire fields.

The application of short-wave networks and ultra-short wave networks, communicative satellites and maritime satellites contributes greatly to the communicative system that governs the fire fighting in fire field..

It improves the fire extinguishing equipment and technique.

Research institutes and sources of funds

? Research institutes

Forest fire protection section of the chinese forestry academy-- fire prevention and protection, ecological fire

State funded chief lab of university of science and technology -- mechanism of forest fire

Forest fire protection institute of Heilongjiang province--- fire extinguishing equipment

The school of resources of forest environment of Northeast university of Forestry-- fire ecology

The school of forestry industry of Beijing university of forestry-- fire extinguishing equipment.

? Source of funds

The funds of the forest fire research mainly come from the ministry of science and technology, national committee of natural science fund, national bureau of forestry, and some other organizations at provincial level.

Special points of recent study

? Forecast of forest fire

forecast is the premise for forest fire prevention, so it has been put much stress in every country. It can make fire prevention work go on in a reasonable way to calculate the possibility of a forest fire. We started doing it in the 1950's. In the past decades we just borrowed from abroad and tried the fire causing weather forecast method though we improved the method somewhat. Now we have some progress in this field. Quite a number of provinces and autonomies are already capable of doing the forecast job successfully. This establishes a strong foundation for the building of the nation wide forecast system. We have done the classification of various burnable substances and given a study to fire behaviors, which is another foundation of our forecast study.

? Fire detecting technology

The study in this aspect is to improve the detecting precision by combined use of ---, GPS and ---. We can set up a database of forest fire messages. Then we put into the database all the information we gather from the forest map, topography map, and the ----- . After analyzing the data we gain what we need concerning management of the forest, ----, ----- and change of the environment. By using all the data, we greatly raise the level of fire detecting.

? Commanding fire fighting through information

The transmission of message on forest fire must make it possible for fire fighters to get messages whenever and wherever they need. (for example when they are fighting the fire, when they want to prevent the fire or when they want to know how to use the fire safely). Especially as soon as detecting the fire, the message should be sent to the commanding center so that the center can arrange to send in time fire fighters and materials it needs to put out the fire to reduce the damage as much as possible. To achieve this, the message must be transmitted without stop between spots on land, between spots in the air, and between the air and the land. So we need to further the present system of communicative networks, at the same time we need to further develop the communicative technology in the fire field. We need to use the short wave and ultra short wave to solve the communicative problems in the remote areas where message is difficult to reach.

? Fire extinguishers and fire fighting products

It is not enough to have only scientific theories to prevent the forest fire. We need to have the advanced tools also. So we should not neglect the study of fire fighting facilities

? Isolating technology and the management of the burnable substances

The management of the forest fire is not simply to prevent the fire passively but to actively prepared ourselves to prevent fire or to put out fire or even to use the fire through the technology of isolating the big fire and by managing the burnable substances. In future we need to do work in designing the fire preventing line and managing the forest by use fire.

? Fire fighters' training

Knowing the importance of fire fighters' training is the basis to reduce the casualties and raise the efficiency of fire fighting. At present we badly need to strengthening our skill training of fire fighting and textbook compiling, and adding the number of our fire fighting facilities. In

addition, we need to formulate our regulation of fire fighting training. In our training we need to use the multi-media resource, the computer network resource and some other facilities.

? Building the system of standardization

Forest fire protection is a complicated system. It covers large content, involves a large area of different places and complicated technology study. It is concerned with the standardization of different fields such as the basic equipment and facilities, products, forecast, fire prevention, communication, fire-fighters' protecting outfit and fire extinguishing equipment. The standardization in various aspects of the work of forest protection urgently needs to be realized. So we are to start our study in the system of standardization.

? Management in fire fighting

We plan to put more efforts in helping the public raise their sense of fire prevention and safety. We are going to make the most of the modern media such as newspapers, radios, televisions and the internet. We are planning to set up our own web site through which we could let the public get our notices, multi-media training software and booklet on forest fire protection.

Conclusion

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Monitoring system is composed of the application of Meteorological satellites in monitoring and predicting forest fire and the application of distance satellites for emergency in communication.

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