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Fire Insurance
on
Logging Operations
by
Wm. W. Ingenhutt

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Professor of
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IN MEMORY
OF THE MAN WHO MADE
THIS THESIS POSSIBLE
ANTHONY W. INGENHUTT

SCHOOL OF FORESTRY
OREGON STATE COLLEGE
CORVALLIS, OREGON

TABLE OF CONTENTS

Introduction ..	1
Part I: Fire Insurance on Standing Timber	2
What Is Forest Fire Insurance In Relation to Standing Timber?	2
A Brief History of Forest Fire Insurance	5
Reasons for Forest Fire Insurance	8
Methods of Determining Rates for Forest Fire Insurance	10
Essential Parts of the Established Business.....	15
Development of Rates	15
Rating a Specific Risk	18
Formation of the Forest Fire Insurance	20
Adjustments	21
Special Conditions Attached to Policies	22
Types of Companies	25
A Plan for Combined Insurance and Fire Protection.	27
A Plan for Combined State and Federal Insurance...	31
What this Study Represents	33
Part II: Forest Fire Insurance on Logging Equipment.	36
Notation Concerning Part II.....	36a
History of Fire Insurance in Connection with Equipment	37
Rates for this Type of Insurance	39
Conditions of Certain Policies	44
Conclusions	47
Bibliography	51

INTRODUCTION

In this day and age when forest fires are so common and devastating, we must consider that part of the lumber industry that is surrounded by a large question mark, namely the safety of our investment. We have been using fire insurance to a certain degree on the mechanics of logging for some time, but it has never been used to any great extent in the protection of the investment in standing timber. This latter investment is, in reality, the greater part of the whole.

In this forthcoming thesis, I am going to point out the various phases of fire insurance. First, we will consider the part that it might play in relation to standing timber or the protection of the investment, and secondly, the part it does play on actual operations.

WHAT IS FOREST FIRE INSURANCE IN RELATION TO STANDING TIMBER?

Strictly speaking we might say that this type of insurance is the assurance that we will receive a certain value in the event of losing our timber by fire in return of a payment of a certain consideration. Naturally we would first have to consider the risk and the various phases of insurance, as is done with other types. Certain areas of this country are by far in greater danger of fires than are others. Secondly, we must consider the fact that each area has its own type of fire. Some areas have typically slow fires whereas others have fast fires. Similarly, there are a great many causes of fires. In some regions fires started by nature are the predominant type of causes; whereas in other regions we must consider the fact that the main causes are by man, and the different types of man-caused fires. We could go on with this and enumerate all the features used in the determination of fire premiums, but it is in reality not what we are after. What we do want is: WHY should we have this type of insurance, and when we show the "WHY" of it, can we also show the practical side of the picture?

No matter what anyone might say we cannot deny that our forest resource values are becoming lower as time goes on. We can attribute this to many sources, one of which

is the burning of our forests, both virgin and second-growth, and the already denuded areas. Fire is an inevitable thing, and the best thing we can do is to become used to it and keep it to a minimum amount of damage. When areas are burned they are often allowed to revert because the owners cannot afford to pay taxes on lands that have no timber value. However, if these lands were insured against fire, we would have a far different story to tell. Of course we could not expect to see the complete prevention of fire, but we would have a change in the after-effects of the fire. First, we will assume that a concern has just had a certain part of its lands burned and there is no hope for the area to be seeded by any natural means. If this area was not covered by any form of insurance, the owners would have very little choice in the matter and would probably allow the land to revert. This would probably not do anyone any good. However, if the land were covered for a partial loss, since partial coverage is more plausible than full coverage, we would have a sum ready for reseeding and in this way continue to replenish our stock. The larger concerns are naturally more adapted to such a plan than a smaller one would be.

Another thing we must consider in this set-up is the insurance of a person's investment. We cannot expect people to invest money in the forest industries if there is too great a risk of their losing their money by the

careless toss of a cigarette.

In the early days of the Pacific Northwest lumber history we had a great deal of speculation in regard to the price of timber. People in the East payed exorbitant prices for timber and some of them lost everything by the fires that came later. Now the public is more or less soured on the idea of investing money in such enterprises. If we could possibly insure them against such losses reoccurring, we may again see the forest industries in their rightful position in relation to other industries. I feel that such a thing is possible and that forest fire insurance is one of the solutions.

A BRIEF HISTORY OF FOREST FIRE INSURANCE

According to the records, the first policies covering forest lands against forest fires were written in the Scandinavian countries about the middle of the nineteenth century. Soon the other countries of Europe followed suit, and it became a more or less common thing in that part of the world. However, these companies were not so interested in the logging operations as they would be in this country. Secondly, there were a great many limitations as to the amount of timber to be insured and also their classes. However, we can say that this type of insurance has a good start in the European countries, which is more than can be said about the same here in the United States.

Here in the United States we have had various attempts at writing forest fire insurance, but they have not been too successful. The first policies were written by the larger eastern companies about 1910. However, these again were not connected with logging operations, but rather with the small farm woodlots so characteristic of the East and New England. These policies were usually taken out by the farmer who had an eye for the future and was safeguarding a sure income for future years. Another discouraging fact that was in the way was the fact that some companies limited their policies in the amount to be paid the insured. We also had the coinsurance clause in most of the policies and

this of course made it anything but feasible to the larger timber owners. On the other hand it was very satisfactory to the smaller timber owner.

Some of the companies that deal in this type of insurance are the Globe and Rutgers Fire Insurance Company, Hartford Automobile Insurance Co., Home Insurance Co., and several of the states have started "Mutual" companies. However, this latter type has slowly given out except in a few of the New England States.

Here in Washington and Oregon there have been a few attempts to write this type of insurance. Up to within the past year or two these attempts have been known only for their complete failure. However, there has been something of a change in the more recent times and the idea of such a type of insurance is becoming a standard thing. This is especially so in relation to the various "Sustained Yield Projects" and "Selective Logging Operations" that are now coming in. If these projects are to be a success, there must be some form of assurance that fire will not mean a complete loss. However, that belongs to another part of this thesis and it is best that we leave it until that time.

Other than the above-mentioned companies we have had but one real attempt dealing with Forest Fire Insurance here in the Northwest. This attempt was the result of the gathering of ninety-one operators and forming the organization that was later to be called the "Logging

Underwriters and Inspection Association". Their work dealt with felled timber and logging equipment only. Policies on standing timber were not even solicited.

At the present time (January 1940) there are really only four companies carrying on any real business in this field. They are Globe and Rutgers Fire Insurance Co. of New York, The Home Insurance Co., The City of New York Insurance Co., and the Franklin Fire Insurance Co., of Philadelphia. These companies confine their activities mainly to the East, but their agents here in the West are authorized to handle any requests that may come up for this form of insurance, but it is not to be solicited.

REASONS FOR FOREST FIRE INSURANCE

Some of the main reasons for forest fire insurance in this country that we do not find in the European countries are those listed below.

First we come upon one and probably the most important reason, the advent of the forester's ideal of sustained yield. This type of project is still in its infant stage and must have plenty of encouragement if it is to succeed. It will take a long time for it to develop and with this period of time we will also see the added risk that will come with it. It would not be a good thing to see such a project go through three-fourths of its life span and then be ended because of some destroying fire. True, insurance cannot stop the fire but it can aid in the development of better prevention methods, and it will also aid in giving a concern a better start or at least enabling it to start again.

Another strong reason for this type of insurance is the method of logging now in progress. The present high-powered machinery that is now being used causes great devastation and an added fire hazard compared to what the conditions were when the lumber industry first came to the West Coast. This includes the use of "cats" as well as the stationary type of power unit. With this additional hazard we must have some assurance that everything is not going up in smoke and later become a total loss. As was previously

stated, the carrying of fire insurance will not stop a fire but it will ease the loss when the fire does come. And that is what we are aiming at now as this form of insurance is beginning to come to light.

Another important factor along this line is the fact that banks are beginning to insist that their clients carry some form of insurance so that their investments are safe. In many of the loans that are now being granted there is a clause stating that equipment and timber to a certain amount must be covered by adequate insurance, otherwise the note will become due upon failure to comply to this ^{with} agreement.

To the people of today we have one need for insurance that stands out above all others. That is the fact that it has "better" fire protection on the up-grade. This is a fact that does everyone some good. Since one of the deciding factors in determining the rate that is to be charged is the amount of fire protection, the operators have found that it pays to give their property the best protection possible. This, I feel, is a very important point and not to be forgotten. Insurance calls for better protection, and as a result we have better protection.

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METHODS OF DETERMINING RATES IN FOREST FIRE INSURANCE

When this type of insurance was first given any consideration, the companies handling it found that their greatest trouble was the fact that they had little or no information on the subject. This was also one of the factors that has held it back and stopped what little development that may be expected from it. When the first policies were taken out here on the West Coast, it was soon discovered that the rates quoted were altogether too low. Naturally this did not make money for the insurance companies handling the policies and that is their primary aim in business. Finally a system was devised whereby rates were figured just as they are with any other form of fire insurance. Averill (19) has given a chart showing how the building hazards are figured on the same basis as are the forest hazards.

BUILDING	FOREST
1. Element of risk:	
Structure	Soil conditions and composition of the forest upon which the combustibility depends.
Occupancy	Uses of the forest, i.e., Commercial, Recreation, Demonstration.
Exposure (external.... source only)	Forests are subject to both external and internal exposure,

such as railroads, smokers, campers, and other sources of ignition.

Protection Same

(Private and Public)

2. Element of place: ... Variation in fire loss depends on climatic conditions and protection system.
3. Element of time Variation in fire loss would depend on the variation in the hazardous conditions.

Since the rating schedules of the regular insurance field are the accumulation of several centuries of work, we can hardly expect the same degree of accuracy with this form as we do with the other forms. This would take a number of inspection trips over an area to gain the necessary information for these schedules. However, it has been found that if we use the above table and coordinate it with the one below we have a basis upon which we can develop our assumptions.

Lands are divided into three main classes:

1. Commercial: Land used for commercial purposes only.
2. Semi-commercial: Land such as the MacDonald Forest used for demonstration, research, and instruction purposes.

Land such as farm woodlots that are

private but the surplus growth is sold for such things as firewood etc. Usually found in the Eastern part of the country.

3. Non-commercial: Privately owned forest in the estate form and private recreational areas.

From the above we can easily see that this is about as good a start as could be expected. We have a firm basis upon which to start our study and from here on we must have the facts and figures in regard to the annual fire losses and the annual valuations. These latter figures are the ones which give us the greatest amount of information in determining our premiums.

Naturally the incidence of fire is one of the most important factors in the determination of rates. Some regions are much more liable to fire at one time of the year than are other regions. This would come under the elements of "time" and "place". Another feature along this same line is the fact that fires in some regions are much more serious from the rate of burning aspect. One area will have hot and fast fires whereas other regions will have slower but more lasting fires. Another important thing in this line is the conception of just what is a forest fire. Often we find that a fire that is in reality nothing more than a "brush fire" is called a forest fire. This of course must be discounted in the computation of risks and rates. This all leads to the one thing, that is, what

effect and to what extent does the number of forest fires have on the rates of this type of insurance.

The second consideration that we will take up is the distribution of the fires. Naturally we will have higher rates in an area where there are a great many fires than we would in an area of a few fires. However, this subject will be taken up at a later time.

Hazard is the greatest determinant in the computation of rates. In this case as in all others we have both positive hazards and negative hazards. Most of these hazards can be found in any fire protection manual, so there is no need of going into them any deeper. From Herbert (15) we find that he has set up a table of rating system that is of great use on the decisions concerning this question. It is as follows:

BASIC RATE \$0.50 PER \$100.00 VALUE		plus	minus
Cultural features on or within one mile			
Steam railroad	\$.20		
Patrol system		\$.10	
Oil railroad	.10		
State highway	.40		
Dirt surface road			.20
Establishments			
Industrial	.20		
Camping site	.15		
Within three miles of any town	.10		

	plus	minus
Protective features:		
System of patrol		\$.05-.10
4/5 of the property visible from look-		
outs within ten miles		.10
1/2 to 4/5 of the property visible from		
lookouts within ten miles		.05
Land posted with trespass notices		.10
Land posted with fire notices		.02

NATURE OF STAND

Plantation under 25 years

Conifer	\$.30
Broadleaf	.15

Natural young growth under 25 years

Conifer	.30
Broadleaf	.15

Other pure coniferous types

Swamp lands	.05
" " other than conifers	.05

Owner or agent residing on property	
during the fire season	.05

Under this schedule rates run from \$0.10 to \$1.95 per \$100.00 value.

The basic rate was set at 100 times the burning rate and a safety factor of 300% was applied.

It must be remembered that this schedule was made up for the Eastern part of the country and cannot be used here without other considerations being taken up.

ESSENTIAL PARTS OF THE ESTABLISHED BUSINESS

Actually premium rates are based on the theory that all risks can be analyzed and the hazard measured. It is in this respect that the above table has been inserted, that is, to show just how the plan of action is covered. The classification below is that of Sparhawk. (22)

There are three main points in determining just what the rate should be on any given risk or property.

1. ADEQUACY: The rate should be high enough to cover all probable losses, expenses, and profit. This was one of the weak points when this type of insurance was first considered. At that time the rates were too low.
2. FAIRNESS: Risks should be classified in normal, self-sustaining groups.
3. CONSISTENCY: Risks of equal hazard should be charged with the same premiums.

DEVELOPMENT OF RATES

Rates were originally based on judgment. There has been a lack of scientific rating because of the inadequacy and inconsistency of fire records and because no central organization has been established to standardize fire records.

The ANALYTICAL METHOD of classifying rates is generally used by most fire insurance companies. Risks are classified according to this method into a few broad groups, subdivided, and, by the judgment of the appraiser, each specific hazard is rated.

Rates should be based on experience; no two risks are alike. Therefore experience demonstrates the cost of the average risk of each class, not the cost of a specific risk. This principle is recognized by the National Board of Fire Underwriters in their "Experience Grading and Rating Schedule". This table is basically the same as that given by Averill (19) and is found on page 10.

Sparhawk (22) states that basically fire insurance in relation to forests is the same as it is in any other place. This is also upheld by Averill (19) in the above-mentioned table. Sparhawk also states that the classification that should be used here in the United States should be wider than the one used in Europe. The five considerations that he uses in his classification are the following:

1. Damage depends on the area burned over, volume per acre of burned forest, and the proportion of value destroyed.
2. The area burned over depends on the number of trees that start and average acreage per fire.
3. Number of fires depends on the presence or absence of causes.
4. Average acreage per fire depends on the difference of

climate, types, inflammability, and effectiveness of the suppression organization.

5. The proportion of the total value of burned forest depends on the climate, type, age and condition.

Sparhawk's proposed method of classifying risks:

1. Divide the country into 20 or 30 regions on the basis of climate and general forest conditions.
2. Classify the principal types in each region, making 5 or 10 divisions.
3. Divide each type into four age groups: reproduction, poles, immature merchantable, and mature.
4. Divide each age group into five grades of comparative inflammability accounting for character and condition of the ground cover, snags, moss, dead branches, density, pitch streaks, character of the soil, slope, and exposure.
5. Grade each inflammability class into five groups of comparative possibilities of suppression, scoring such points as detection, communication, transportation, location of the regular force, location of equipment, etc.
6. For occurrence of fires, classify each type in each region and subdivide according to exposure to causes of fires. Consider special hazards.

RATING A SPECIFIC RISK

To rate a specific risk, classify according to the specifications given and multiply the damage factor for that class by the area factor for the sub-class time occurrence factor for the kind of hazard involved.

Although this system is based on experience, it may be seen that it is much simpler than that of the National Board of Fire Underwriters in their scheme of experience grading and rating. Its difficulty lies in the fact that past fire records are not complete and are not standardized.

One of the big difficulties in setting rates for a beginning company is finding a rate that forest owners can afford to pay. There has been little to offer on this subject up to the present time. In 1926 a committee for the West Coast Lumbermen's Association sent out several hundred questionnaires concerning the subject of forest insurance. One of the questions was "What is a safe and reasonable rate?" The suggestions varied from $\frac{1}{2}$ to 5%, the average being about 2%.

Averill says there are three parts to insurance rates. They are:

Loss cost	55%	of	the	total	rate
Expenses	40%	"	"	"	"
Profit	5%	"	"	"	"

These figures are for building insurance and it is not known whether they will fit in the same manner for forest insurance.

Averill compiled the following rating schedule from loss figures obtained in Massachusetts:

Class of risk	Grade	Rates	
	Range in points	Range	Average for class
Low	up to 40	up to \$0.15	\$0.15
Average	40 to 80	\$0.15 to 0.20	0.18
Mild	80 to 120	0.20 to 0.30	0.25
High	120 to 200	0.30 to 0.75	0.55
Serious	200 to 300	0.75 to 2.00	1.40

To rate a particular risk, the grade is obtained from the grading schedule on page 13; the premium is then determined from the rating schedule given above by use of the grade.

THE FORMATION OF A FOREST FIRE ACTUARY

As was previously stated, it is a known fact that we must have some method whereby we can gain information as to the facts about fires, their occurrence and various other things about them. This would include, as a whole, the forest fire actuary. We must have this information if we are to make forest fire insurance a success. It is believed that a board should be set up that would secure all the statistical facts bearing on the subject. The facts compiled by such a board, which would be composed of professional men as the present fire insurance actuary boards are, would be the following:

Fires.

Location.

Size.

Times occurring.

Various losses on each fire.

Protection plan for each area.

Hazards (natural and man-made)

Commercial operations.

Recreation areas near and in each district.

Government agencies on each district.

Previous burns.

Administration of the area.

Coverage of commercial enterprises (open-air business)

Methods of gaining all pertinent information.

ADJUSTMENTS

As in the case of all fire insurance we must first set a value on the property before the policies are issued. This is important because, after all, the rate that is used is determined to a certain extent on the valuation of the property.

This will have to be done by use of a cruiser and his valuation. Naturally the area in question will have been cruised and a value set on it. This value will, of course, have to be agreeable to both parties concerned with the policy. After the fire has come and the adjustments are to be made, we must again cruise the area and ascertain the value of the timber remaining and the damage done.

Shepard (22) states that adjusters should endeavor to persuade the operator holding damaged timber to modify his cutting plans in order to salvage as much as is possible. Such an agreement might be put in the policy when taken out. Where speculatively held timber is lost there will often be no immediate prospect of salvage and in such a case the index to the indemnity is the full amount of the timber damaged. Title to the damaged portion always passes to the carrier who has paid the indemnity.

Agreements as to unit values need not be delayed and should be signed.

The practice of basing adjustments on the "Woods Run" should be closely adhered to.

SPECIAL CONDITIONS ATTACHED TO POLICIES

Average-distribution Clause:

A clause of such a nature brings us right along with the "Coinsurance" clause which will be treated next. In reality it stands for the equal distribution in case of any damage done to any piece of property closely alined with it. Shepard (18) states the same thing in the following words, "It is understood and agreed that in event of loss, this insurance is attached to each of the buildings (properties) described herein, in the exact proportion that the value of each building shall bear to the value of all such buildings at the time of the fire." Without a rider in this form we would not have the Coinsurance principle in case one part of the whole should be damaged.

Coinsurance:

Coinsurance has one real purpose and that is to place losses and premiums on the same basis. Forest insurance is a comparatively young field in this country and it is thought by the more experienced persons that if it is to be successful they should stick close to the coinsurance policy. At least there is a greater chance of success if it is followed. One hundred per cent coinsurance is recommended to the newest parts of the industry.

Partial Value:

The Partial Value clause in a policy is nothing more than what it infers. That is the loss paid is equal to the

percentage that the policy covers.

$$\text{Indemnity} = \text{Loss (X)} \frac{\text{Amount Carried}}{\text{Amount named in Average Clause}}$$

If such a clause is used then we have the fact that in reality the insured receives only a part of the value of the property that is destroyed. Such a policy would of course carry a lower rate; and it is recommended by some that the company issuing the policy take only 75% of the risk. This is one of the methods recommended for control of the enterprise until we have more definite information on how to care for this type of insurance.

A sample form of this type of clause is taken from Shepard (18):

"It is understood and agreed to be a condition of this policy that, in the event of the loss or damage by fire to the property insured under this insurance (policy) this company will not be liable for an amount greater than three-quarters of the actual cash value of each item of the property covered by this policy and at the location and as of such a time immediately preceding such loss or damage; and in event of additional insurance, then this company shall be liable only for its proportion of three-quarters of such cash value of each item insured not exceeding the amount insured on each such item."

Miscellaneous Clauses:

Location: The location shall be of the exact deed and legal description.

Mortgage: Whether or not there is a mortgage on the property should be stated and if so, to what degree.

Lapse of time between the loss and settling of adjustments should be stated.

Reduction in Rate: A warranty of reduction in rate should be made by the regular legal procedure in case it is desired.

Species: The species of trees and the percentage of each should be stated.

Exemption of the payment of small losses should be made by the company issuing the policy.

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TYPES OF COMPANIES

Up to the present time there have not been any companies formed that deal in this type of insurance alone or to any great extent. To the writer's knowledge there are only four types of companies issuing these policies now.

STOCK: These companies are usually regular corporations and are in the business for the purpose of making money. They have a capital stock and in this way guarantee their policies. It will be these companies that give us the greatest amount of strength in the advancement of this work.

MUTUALS: With this type of company we have a weakness in that they do not have sufficient capital to withstand the heavy losses that can be taken by the Stock Companies. These companies pay out a certain amount of the surplus to the policy holders and are therefore not organized for the sole purpose of profit.

RECIPROCAL: This type of company is the same as the Mutuals except for one thing. The policy holders are the insurers as well as the insured. They appoint a man, an attorney, at the head and he uses a certain percentage for operating charges and the remainder is used to pay losses and to go out as profit to the

policy holders.

LLOYDS ASSOCIATIONS: This is a group of underwriters who are in the business for their own profit, and each member is responsible for the contracts made by the others. They are not necessarily associated with Lloyds of London.

A PLAN FOR COMBINED INSURANCE AND FIRE PROTECTION

One of the things that we hope for with the advent of this type of insurance is that it will aid in the advancement of fire protection. Brewster (6) has outlined a plan for combined insurance and fire protection, for the State of Wisconsin. This plan would be self-sustaining, automatic, and would aid in increasing the area of timber producing lands wherever it might be adopted. This plan calls for the inclusion of all lands that have ever had timber on them and are now brush lands. The reason for this move is that if fire is kept out of these lands they will, in time, have timber on them and thus we will have the increased timbered area mentioned above. It is my belief that this plan may be adapted to any state in the Union if a few minor changes are made for local conditions.

The first thing to do would be to assess all timber lands in the state at a minimum rate of 2¢ per acre, per year. Naturally we would have to eliminate the small farm woodlots since they are really not of commercial importance as far as the logging industry is concerned.

The second thing to do would be to keep these lands in a continuous belt so that we could obtain the maximum efficiency per man in the protection force. Brush lands of the above-mentioned character would also be cared for in the same manner.

In the computation of rates and premiums we would consider \$1.00 per acre as the minimum insurable valuation. At the option of the owners of commercial species of timber their timber lands may be valued up to \$50.00 per acre. However, if such is the case then we would have an added premium. This would amount to 1% in addition to the amount of the original assessment.

During the first years it would probably be safer to have a larger base assessment. This larger assessment would be about 5¢ or some similar amount. This would be only at the beginning and in later years we would see the premiums go down, and in about 50 or 100 years, the assessment would amount to only the insurance rate and we would not be bothered by the protection rate since this would have paid for itself. However, this should be sufficiently large, so that we could have a reserve in case a bad fire season should come and cause a great amount of damage. At the same time we would see the charge reduced as our protection facilities were increased.

Wilful burning would be discouraged by making the minimum value of the land little more than nominal. On top of this we would have the extreme penalty of the law which would be enforced stringently. This combined with efficient inspection and appraisal would keep arson and criminal negligence to a minimum.

Naturally we would have to have some type of a board for the settlement of disputes and appraisals. This would

be composed of members who are disinterested, yet sufficiently well-informed to be able to render just decisions.

In Wisconsin it has been suggested that this plan be put under the Forest Fire Insurance Department of the Conservation Commission so that we might be able to use the existing agencies of protection. In Oregon this would be the State Board of Forestry.

In this above plan it has been suggested that State and Federal lands be exempted from the assessments made but they would still receive protection from the same place. That is, the independent owners would in reality be paying for the protection of public timber. This, I believe, is the weakest point in the whole thing, and it is also as unfair as anything could be. I believe that that suggestion should be stricken out without further delay. It is most impractical.

The advantages from such a plan as this would be much the same as for forest fire insurance as a whole. We would be receiving protection and insurance for the price of one. The owner would receive something even if the protection failed. It will be easier to receive loans on the timber when there is some assurance that everything will not go up in smoke even if there is a fire. It will also be an automatic distribution of risk if combined with tax reform. If this latter point is ever straightened out we will see that timber growing will be much safer and much more attractive.

One of the biggest points will be the fact that we would be able to set up a definite management plan if a certain amount of the income were to be earmarked and set aside for this work. We would also have this management area for a splendid example and be able to prove if forest management is really a practical idea, or if it is only an ideal of the technical forester.

A PLAN FOR COMBINED STATE AND FEDERAL INSURANCE

by P. A. Herbert

1. Make it compulsory to insure all forest land (optional on farm woodlots).
2. Make values subject to the state forester (Expectation or market value).
3. Establish forest actuaries to determine hazards, losses and values.
4. The organization for such a plan would be as follows:
 - a) State Forester will be responsible for its administration.
 - b) Tax collectors to collect the premiums.
 - c) The forest actuaries are to meet the approval of the Federal Government.
 - d) Premiums to be deposited in the state treasury and removed by the State Forester only.
5. Federal Government shall be empowered to reinsure risks written by the states if the states' conduct in this business meets with the standards of the Department of Agriculture.
6. Reinsurance to be written at approximately the average fire loss for each state.

This plan has, of course, been compiled by someone who is more familiar with the subject than I am. However, there seems to be a difference between the authorities as to whether the State and Federal Government should work on

this together or whether it should be the Federal Government alone. I feel that it would be a more secure administration if it were the Federal Government alone, though if the above plan were to be used, I would modify the second item. In my estimation that point gives the State Forester too much authority and should be changed to give the Government more to say about the values insured.

WHAT THIS STUDY REPRESENTS

Actually forest fire insurance on standing timber is in its youngest stage, in fact, we can say that it is in reality in the embryo form of the experimental stage. However, if the forest^{er} of the future gives his whole mind to the work, I believe that in time we will see this as one of the most important fields in forestry. That includes both commercial and Government forestry. When it does develop to its fullest extent, I believe that it will be a much-needed stimulus to what is slowly becoming a lagging industry. I also believe that it will not be too far in the future that we will see fire insurance courses given in the colleges that will have as much significance as any that are given now.

The technical underwriting and administrative problems encountered in the writing of forest fire insurance need not be feared. These solutions will be no more difficult than some that have been encountered by both the insurance and timber industries. The main essentials are the determination to succeed on the part of the insurance companies, and a willingness on the part of the forest owners to give proper support in the form of a large volume of business, with the spirit of fair play on the part of both.

The money that insurance companies obtain in the form of premiums is really only the operating expenses of the

of the company. Hence, if there are but a few policies sold for a given form of insurance, we can see that there will be a shortage in funds with which to pay for the expenses accrued from the issuing of the policies. The money that goes for the payment of losses and dividends of the company is earned from the investments that are made with the surplus and the capital stock revenue. We already know that the rates for this type of insurance must be low. Hence, if this is to be the case, we must have sufficient funds in the form of premiums to offset the expense of issuing the policies. This is where the timber owners are to come into the picture. They must give the insurance companies a sufficient volume of business to offset this expense. We must have low premiums, otherwise we will see that the cost of the insurance will be too great for the timber owners to pay.

This form of insurance is especially valuable to those whose timber is almost mature, because it represents a large investment near liquidation, and should be protected.

Laws regarding the forming of new companies are very exacting, and rightly so. They should be inspected often just as the properties they insure should be examined and inspected. The older companies are not especially pleased to see new companies come into the field, and are continually trying to stop them from being formed. However, I believe that if these "Old Line" companies do not come out and openly solicit the business of the timber owners, they

must make way for the newcomers, and allow this form of insurance to gain its rightful place in the field of insurance as have other forms.

Even if an owner cannot carry a large policy, I firmly believe that he should carry a little insurance for his own good fortune, and since the fire hazard is always there, other things being equal, it is preferable to pay an annual premium than a troublesome discount on Capital.

END OF PART ONE

PART TWO

FOREST FIRE INSURANCE ON THE MECHANICS OF LOGGING

NOTATION CONCERNING PART TWO

The second part of this thesis will be seemingly shorter and out of proportion when compared with Part I. However, this may be attributed to the fact that there are several divisions in the first part that are to be applied to this latter half. These sections are as follows:

Reasons for Forest Fire Insurance.

Forest Fire Actuary.

Conditions of Certain Policies.

Combined Insurance and Fire Protection.

Combined State and Federal Insurance.

HISTORY OF FIRE INSURANCE IN RELATION TO EQUIPMENT, ETC.

When we speak of this type of insurance, we find that it is similar in nature, but also different. It did not come in until forty or fifty years after the type we have already discussed. Yet, in this comparatively short time it has developed quite far beyond fire insurance on standing timber. However, it too is in its infant stages of development. The same companies that handle insurance on standing timber also carry this form of insurance, but they do not go out and solicit the business of the operators, as might be expected. Instead, they accept policies without relish. The only explanation of the greater development of this type of insurance is the fact that there is a little more demand for it than in the case of the former. It was first considered about 1920, by the operators here in the Douglas fir region. However, it has been held back by these operators because of the moral hazard rather than for any other reason. They have not been as honest as they might be in respect to the companies issuing the policies.

This latter fact has proven to be the worst of all the hazards that could be imagined. Many of the operators committed arson when this type of insurance came into being, and it was this that discouraged many of the insurance companies from even issuing this type of policy. In areas that were especially close to incendiary habits,

the companies would not even consider a policy.

In 1926 a pool of companies (lumber concerns) formed the Loggers Insurance Underwriters Association (Ellis (12)). This pool was the first big move in that direction, but it did not secure the right results, and was soon formed into the Loggers' Underwriting and Inspection Association (1928). The first years of this organization proved two things. One was the importance ^{of} fuels in the list of forest fire causes. The second was the importance of relative humidity during the fire season.

Since the beginning of this association, we have always had the cooperation of the Pacific Logging Congress. This has always been a booster for the Association.

RATES FOR THIS TYPE OF INSURANCE

When this type of insurance was first issued, the rates were too low. They had been taken on a comparison with other rates, and when computed, it was found that they did not allow enough for the added hazard connected with this kind of an industry. As was previously stated, the insurance companies are in business to make money, and not necessarily for the benefit of others, as some people think. The premiums pay for the operating expenses and possibly for the research done in order to make lower rates and at the same time make the possibility of issuing more policies more probable. At first the companies had nothing but bad luck, and were anything but willing to issue more policies. This condition was not helped in the least by the fact that many operators over-insured their properties and then started the fires that burned them out, causing excessive losses to the insurance companies. However, after the first few years, there was a change, and soon some of the companies started to solicit ~~for~~ business. They were, however, very "choosy" as to whom they solicited. Such is the condition today, with a few exceptions.

The first methods of writing were more or less complicated, and the pool formed by the ninety-one companies was in reality nothing more than a clearing-house for the insurance companies.

Later a change came and the agents selected the company, gave them the policy and collected the commission of ten per cent. Each risk was, of course, inspected and appraised before the company accepted it.

At first all classes of risks were placed in the same category. No distinction was made for the degree of protection that the operation might have. The next step was to change this, and we then had four classes of risk with each subdivided. This is the basic principle that we are working on at the present time.

Naturally the degree of protection is one of the major considerations that we include when we figure the class. We also use the same table that is used for figuring the rates in insurance on standing timber (page 13). Other things considered were the amount of stationary equipment, rolling stock, and trestles.

A humidity clause was always inserted in the policy and was at one time thought to be of supreme importance. It is still in the policies but is not so important as it once was. At the present time there is a similar factor that is considered more important; that is a clause concerned with the moisture content of the fuel within the logging area. The operator that heeds both of these clauses will find that he can obtain a much lower rate than if he does not.

FIGURING RATES FOR INSURANCE ON EQUIPMENT

When a company issues a policy of this sort on the equipment of any logging camp, they go through the same process as they do in the case of the equipment of any other type of a concern. If it is a reasonable risk, they will naturally accept it and all will be calm. However, at the present time there is a board of inspection in the Pacific Northwest that inspects all insurance policies no matter what type of a company is doing the insuring. These boards are run by the Federal Government and are interested in both the company and their clients. The insurance companies also have a board (in relation to logging risks) that is formed into a sort of cooperative group. An operator will take his risk to the company with which he deals and it in turn will turn the risk over to the above mentioned cooperative system. They in turn review the case and set the premium. Final consent must of course come from the company handling the risk. This cooperative board is often called the "Mutual Ring". This, however, is a misnomer; since it is not composed of mutuals alone. In fact the majority of the companies that belong are stock companies.

The rates set are compiled from the data obtained in the past and by use of tables similar to those printed in a previous section of this paper. The rates of other types of risks are also used, taken from the industrial actuaries.

Naturally, one of the main things in the rating of risks is the consideration of the type of equipment to be insured as well as the use to which this equipment is to be put. The first differentiation would be as to whether the individual piece is a donkey or a "cat." The second would be as to whether the "cat" was used for construction work or for yarding purposes alone.

The rate on a "cat" will be lower than that on a donkey because the former is mobile and can easily be moved from the danger area. Likewise a "cat" that is being used for construction work along has a lower rate since it is not in the area of greatest danger and can also be moved from its position more easily than if it were used for yarding.

The method of logging also has a great deal to do with this classification. Usually in the case of a combination of a swing and yarder, the yarder will carry the higher risk and consequently pay the higher premium. However, it would be well to note that this is only the usual case. In the case of the present truck logging methods the yarder may be located in a place that is much closer to a source of protection than is the swing. In such a case the swing donkey will carry the higher risk. In the usual case mentioned above we will find that the swing is near a railroad and therefore near a supply of water from the tank cars that are required to be there by law. (Gibbons 25)

This brings up another factor in the formation of a rating system and that is the type of equipment that is being used for the transportation of the logs. An organization using a railroad set-up will receive a better rate for its equipment than will a company using a truck-hauling system. This is mainly because the former is more adapted to the large scale hauling often required during the time of a fire. It is also easier to carry water by train than it is by truck.

Naturally the condition of the transportation must be considered as well as its construction. Railroads such as those in Coos County would raise the risk rather than lower it because of being so vulnerable to fire. Wooden trestles are not the best thing for a low insurance rate.

For further information on this part of the development, please refer to the table for basic rates on page 13.

CONDITIONS OF CERTAIN POLICIES

When the first Associations, composed of seven agents and one fire insurance expert, were formed to cover logging equipment, they figured all rates in the same manner as they did for fire insurance on other types of industrial equipment. This single move cost them a great deal of trouble, and large losses had to be paid. These experiences forced them to change their methods and to bring different clauses into their policies.

An example of this is the fact that the Association was taught that slash fires are of great harm when not handled correctly. It cost them \$125,000 to learn this one lesson. In the years from 1926 to 1931 the loss ratio paid by the companies was 133 1/3 %.

Now there are certain conditions connected with all policies as to methods of slash disposal. If the operation is one conducted on the selective cutting basis, the rates on all equipment are raised because of the increased danger. If the cutting is on the sustained yield basis, we have a rise in the rate but not as much as in the case of selective cutting.

A second important thing that has been brought on by the advent of insurance is the use of electric caps. This is mainly in the case of blowing choker holes. Previously it was the habit to use fuse and cap, but now it is next to

impossible to get insurance with a decent rate unless electric caps are used. The insurance can be had but the premium that is paid is nearly prohibitive. This was another expensive lesson that the Association had to learn.

What is probably the most important clause in connection with this insurance is the "dry season clause". This is a clause that is inserted primarily for the operators in the Douglas fir area. Since the loss cost on which the insurers must base their premium rates is necessarily based on the full calendar year, some provision must be made for the period when the hazard is most acute, or at least for the greater part of this period. This is most satisfactorily accomplished by inserting a clause which specifies a certain portion of the year as the most hazardous and allocates the major part of the annual premium to this period. (Shepard)

Another clause that is always placed in a policy is the Usage clause. This clause does not carry any reduction in rate but without it the companies would not issue any policies whatsoever. It has often been the case that a company would have a piece of equipment that was insured but not in use; consequently it was left on a siding or in some out of the way place and when the fire came along the machinery was lost in the fire. This condition has been remedied to some extent by a clause stating that all

equipment must be used a certain per cent of the time, and when not in use outside of this allotted time it should be kept in a storage space that has been inspected by the company and approved for this use. Naturally this type of a storage space (boneyard) must be protected from fire. Even with this clause there have been several questionable losses paid because of destroyed machinery that was not being used.

There are several other types of clauses that are connected with this type of insurance, and are also connected with insurance on standing timber. These will be found on the previous pages.

CONCLUSIONS

It is my belief that these two types of insurance are theoretically possible, but as to whether or not they are possible in the practical sense of the word is still another thing to consider. The latter type, fire insurance on equipment, has been proven very practical. At the present time it is considered a major point when new equipment is purchased; by this I mean, it is considered from the viewpoint of operating costs. Some of the manufacturers of logging equipment now require that all equipment bought on the "Usage Plan" must be insured from possible loss by fire. This is their protection from loss, usually in the case of "Gyppo Operators".

When we consider the other type of insurance, that on standing timber, we have an altogether different case before us. First of all, we must consider the greatest hazard of all, the moral hazard. That is without a doubt the greatest detriment to the complete organization. The human race has not yet reached a point where it can be trusted implicitly when a problem connected with large sums of money is concerned. It would be a simple process to insure a block of timber, and then when the right time comes, burn it off and collect the insurance. The cause of incendiary fires is not easily found so the danger of being convicted for arson would be small. However, the insurance companies handling this type of insurance have a method that would aid in this respect. That method is

not to insure the timber for the full value and thereby make the insured the loser in case of the loss. True, it would not be a total loss, but it would not pay to deliberately burn the property.

At the same time the critics of this type of insurance would say that this move would defeat the purpose of forest fire insurance. This is not the case. Since we cannot allow full coverage on any timber property for the above mentioned reason, we must justify the case as it now stands; that is, forest fire insurance is basically a means whereby an operator can regain a start in the field of logging. Without insurance he would probably face bankruptcy unless the concern was fairly large. However, with insurance he would salvage some value, perhaps one-half or three-quarter of the value of the property and would then be able to use the insurance money for a new start in the industry. This would encourage owners to put their operations on a long-time working basis instead of rapidly liquidating them as they are now doing. They would have no need to worry about the work of a life-time going up in one day's fire. At least they would receive something in return for their labor if it was covered to a certain extent by insurance.

It has been demonstrated that there are complete and logical reasons for forest fire insurance. It will aid in making the forest industries stronger and safer. By that

I mean that owing to the speculative tendencies of past years the public has been somewhat "leary" of this industry and consequently have not felt it a wise thing to invest money in such an industry. It was the same with the steel industry, but owing to the farsightedness of its leaders, it is considered one of the largest of all industries, if not the largest, of the manufacturing type.

The companies that handle this type of insurance are willing to take the risk of large losses if the conditions are right. These same companies are sufficiently large and have enough capital to carry the risks. However, the biggest stick in the fire is the fact that the operators are somewhat dubious about the above mentioned companies. This is, of course, a lack of faith and must be remedied if the business is to get a real start. On the other hand, we cannot blame the operators for the sluggishness in this business. We must not forget that the companies, though they are willing to carry the risks, are not anxious to handle the business. So it can be seen that the whole show calls for cooperation from the insurance companies as well as the operators.

This cooperation that has been asked for must come in more ways than one. Naturally it must come in the form of buying and selling. This has already been discussed and we need not go into it any deeper. The next thing that must be considered is the gathering of data on the subject.

This is necessary for the formation of our rating schedules and used as the forest fire actuary. The operators can do a great deal in this matter. Still another point is the necessity for fair rates. We cannot expect the companies to take these risks and lose money, so they must be high enough to make the business pay for itself; on the other hand, the companies must be fair to the operators and not charge them too much for the rates or premiums. Probably the most important thing in the line of cooperation is the honesty of both parties in the business and especially so in the case of evaluations and adjustments. This is essential and without it we might just as well fold up the whole thing and call it a day.

The technical and underwriting problems encountered in forest fire insurance do not need to be unduly feared. Their solutions will be no more difficult than some that have been accomplished by both the insurance and the timber business. The main essentials are the determination to succeed on the part of the insurance companies, and the willingness on the part of the timber owners to give proper support in the form of a good volume of business, with the spirit of fair play on the part of both.

THE END

BIBLIOGRAPHY

1. "Forest Perpetuation and Timber Insurance" Anon., 1920
Timberman, 21 (9): 36-37.
2. "Report of Committee on Forest Fire Insurance" Forest
Conference, 1928, Journal of Forestry, 26 (1) 76-84.
3. Baldwin, H.I., "Scandinavian Forest Fire Insurance
Comapnies", Journal of Forestry, 1931, 29 (1): 134.
4. Barnes, F.R., "Exaggerated and Misleading Forest Fire
Publicity Works Harm on the Coast" W.C.Lumberman,
1926, 50 (599): 34.
5. Bauer, Eital, "A Case in Industrial Forestry", 1931,
Unpublished manuscript, The Harvard Forest.
6. Brewster, D.R., "A Plan for Combined Insurance and
Fire Protection", Journal of Forestry, 1920,
18 (8): 803-805.
7. "Standing Timber Insurance" Journal of Forestry, 1926,
24 (3): 243-249.
8. Chapman, H.H., "Forest Finance", 1926, pp. 295-307.
9. Compton, W.M., "The Desirability of Standing Timber
Insurance", 1923, Timberman 24 (9); 184.
10. Cox, W.T., "Timber Insurance Details", 1923, Journal
of Insurance and Financial Statistics, 3 (2):33-34.
11. Dana, S.T., "Necessity of Forest Fire Insurance",
1923, Ibid, 2(3): 45.
12. Ellis, E.B., "Fire Insurance on Logging Operations",
Timberman, 1928, 29(4): 38-39.
13. Gibbons, W.H., "Insurance on Felled Timber", 1927,
Ibid 28 (4): 38-39.
14. Hawes, E.F., "Insurance on Standing Timber and Young
Growth", 1924, Journal of Insurance Research, 4(2):
25-29.
15. Herbert, P.A., "Comments on Forest Fire Insurance"
1928, Journal of Forestry 26 (1): 85-87.
16. Myers, G.H., "Putting Forest Fire Insurance on a
Profitable Basis" 1923, Journal of Insurance and
Financial Statistics 3 (2): 13.

17. Rendall, R.E., "Immature Timber Protection", 1923,
Ibid. (3): 59.
18. Tyler, L.C., "Forest Fire Insurance Rates", 1923,
Ibid. 3 (2): 32-33.
18. Shepard, H.B., "Forest Fire Insurance in the Pacific
Coast States" U.S.D.A. Bulletin, Tech. 551, Feb. 1937
19. Averill, C.C., "Factors Underlying Forest Fire Insur-
ance", 1933, Harvard Forest Bulletin 17, 1933.
20. Kyle, Donald, "Forest Insurance", 1937 Thesis, Oregon
State College.
21. Dew, N.A., 1925, "New Developments in Timber Insur-
ance", Journal of Insurance and Financial Statistics"
1925, 3 (2): 74-76.
22. Sparhawk, W.N., "Suggestions for Rating Risks in Fire
Insurance", Journal of Forestry, 18 (7): 701-709.
23. Journal of Forestry, 18 (7) 701-709, Nov. 1920
24. Ibid., 34, (12) 1068, Dec. 1936.
25. Gibbons, W.H., "My Experience in Writing Logging Line"
Timberman, 31 (1): 124, Nov. 1929.