AN ANALYSIS OF THE FIRE EXPERIENCE AND

INSURANCE COST FOR OKLAHOMA

COTTON GINS, 1956-1958

By

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CHAPTER I

THE PROBLEM AND PROCEDURE

Introduction

This thesis reports the results of a study undertaken to determine
the causes of and costs associated with cotton gin fires in Oklahoma,
and to determine the relationships between fire preventive devices and
auxiliary equipment and their influence on the frequency of and losses
from gin fires.

Losses from cotton gin fires are among the major risks faced by gin
owners and operators. Insurance premiums for protection against fire
losses, and uninsured losses from fires, constitute a sizeable item of
expense to gin owners each year. In the past few years, however, a num-
ber of fire preventive and control devices were developed and installed
in gins. These devices were designed primarily to remove from the seed
cotton such objects as metal, rocks, and green bolls which are known to
cause fires in the ginning process. It was expected that these devices
could eventually reduce the frequency and extent of gin fires and losses
associated therewith. However, no research has been carried out to
evaluate the effectiveness of these devices in reducing losses from
fires. Moreover, no consideration is given to the presence or absence
of these devices when determining insurance rates.

The losses associated with gin fires, whether shifted by insurance
or not, result in higher ginning costs. These costs are paid directly
by producers through charges for ginning and thus reduce the net

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income from producing cotton. Any reduction in costs due to fire
losses, therefore, would tend to increase returns to cotton producers.
It would also increase the overall efficiency of cotton marketing and
thereby help to maintain or improve the competitive position of cotton
in fiber markets. It is hoped that the analysis contained in this
thesis will be helpful to gin operators in reducing the number of gin
fires and the resulting losses, and thereby lead to reductions in
ginning costs.

Specific Objectives

The specific objectives of this study were as follows:

1. To ascertain the origin and probable causes of fires in
   cotton gins.

2. To evaluate the effectiveness of fire preventive devices on
   the frequency of and losses from gin fires.

3. To analyze the relationship between the amount of cleaning
   and drying equipment in cotton gins and the frequency of, and
   losses from, fires.

4. To ascertain the relationship between premiums paid for the
   various types of gin fire insurance and fire losses incurred
   by the gins.

Scope and Procedure

This study is part of the Southern Regional Cotton Marketing Pro-
ject SM-17 in which eight state agricultural experiment stations and the
Agricultural Marketing Service of the United States Department of

Agriculture cooperated. Actually, however, the overall study was con-
ducted throughout the cotton belt, since AMS workers collected data
in those cotton belt states not cooperating directly.

Sampling Procedure

The sampling procedure for this study was set up by the Technical
Committee, SM-17. It was to be identical in all states. The sample
gins were to be classified in two ways. First, they were classified
according to the amount of cleaning and drying equipment. Within each
equipment classification, the gins were classified by the types of
fire preventive and control devices in the gin.

The equipment groups would include simply equipped gins, mod-
erately equipped gins and elaborately equipped gins. For the pur-
poses of this study, a simple gin is a gin with no cleaning or drying
equipment or with only one dryer or only one overhead cotton cleaner.
A moderately equipped gin is a gin which has in addition to lint clean-
ers either (1) one overhead cotton cleaner and one dryer, or (2) a
combination of one overhead cotton cleaner and two dryers, or (3) two
overhead cotton cleaners and one dryer. An elaborately equipped gin
is a gin with two or more dryers, a burr machine, two or more overhead
cotton cleaners and lint cleaners.

Within each of the above equipment groups, the gins were to be
classified on the basis of fire preventive and control devices as fol-
lows: (1) gins with green boll traps only, (2) gins with magnets only,
(3) gins with complete CO_2 systems, (4) gins with magnets and green boll
traps, and (5) gins with none of these devices.

Selection of Sample Gins in Oklahoma

A list of the cotton gins operating in Oklahoma in 1955 was obtained from the Oklahoma Ginners Association. Each of the 337 gins operating in 1955 was mailed a questionnaire to determine the type of equipment and fire preventive devices installed in the gin. Of these, 294 or 87% returned the equipment questionnaire (Table I).

It was found from the state-wide survey that 172 gins, or 51 percent of all gins in the state, were located in the 14 southwest counties.[1] Moreover, there were only 113 gins in the state that had any fire preventive devices and 103 of these gins were located in these same 14 southwest counties. Since most of the gins with devices were in the 14 southwest counties and the other gins were widely scattered throughout the state, it was decided to include only gins in these 14 southwest counties in the sample for this study.

The survey also revealed that there were no simply equipped gins operating in the state in 1955. Consequently, the sample for the study includes only moderately equipped and elaborately equipped gins. Moreover, the survey also showed that the only types of fire preventive devices in use were green boll traps only and magnets and green boll traps in combination. Thus, there were only three classes based on fire preventive devices: (1) gins with green boll traps only, (2) gins with magnets and green boll traps, and (3) the control group which had none of the devices.

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[1]The 14 southwest counties include: Beckham, Caddo, Canadian, Comanche, Cotton, Custer, Grady, Greer, Harmon, Jackson, Kiowa, Roger Mills, Tillman and Washita.

TABLE I

TOTAL NUMBER OF GINS AND NUMBER OF GINS WITH
SELECTED FIRE PREVENTIVE DEVICES, OKLAHOMA
AND FOURTEEN SOUTHWESTERN OKLAHOMA
COUNTIES, 1955

Item	Location	
	Oklahoma	Fourteen Southwest Counties
Number of gins	337	172
Number of gins returning questionnaire	294	172
Fire Preventive Devices		
Green boll traps	109	99
Magnet	0	0
Complete CO_2 system	0	0
Magnets and green boll traps	4	4
None of these devices	159	69
Not operating	22	0

Source: (1) Oklahoma Cotton Ginners Associations.
         (2) Survey of Cotton Gins in Oklahoma.

The committee had suggested taking a sample of approximately 30 gins with no devices and 15 gins with each type of fire preventive device. However, there were only four gins with magnets and green boll traps in the state. All four of these were included in the sample.

In order to make the sample larger, 25 gins with green boll traps only were included in the survey instead of the 15 gins as suggested. The original sample therefore included 4 gins with magnets and green boll traps, 25 gins with green boll traps only and 30 gins with no fire preventive devices

During 1957 and 1958 several sample gins stopped operating or cooperating. The 1957 sample included 23 gins with green boll traps only, 4 gins with magnets and green boll traps, and 24 gins with no devices for a total of 51 gins. There were still fewer gins in the 1958 sample. It included 22 gins with green boll traps only, 4 gins with magnets and green boll traps, and 18 gins with no devices for a total of 44 gins.

Appendix B shows the breakdown of sample gins for each year and the three year total. In these tables, the gins are classified both as to the type of fire-preventive devices and the amount of cleaning and drying equipment.

Procedure for Collecting Data

Data were collected from the sample gins for the three ginning seasons of 1956-57, 1957-58, and 1958-59. Before the beginning of each ginning season, each sample gin was contacted and given a supply of

fire report cards (Appendix A). The operator was requested to fill out one of these cards and mail it in at the time of each fire. If there was no fire during any given week, the operator was asked to send in a fire report card indicating that his gin did not have a fire during the specified week. This information was then accumulated and summarized at the end of the season.

In addition, a supplementary insurance survey was made each year. A schedule was taken by personal interview each year from each gin operator in the sample to obtain information on insurance premium rates, insurance coverage, premium payments and claims collected. Other information about the type of insurance and insurance companies was obtained also.

Method of Analysis

Year-to-year variation in gin fire experience due to uncontrollable factors is such as to render suspect an analysis based on data for a single year. Moreover, as pointed out above, there was a different number of gins in the sample for each group for each of the three ginning seasons, except for the four gins with magnets and green boll traps in combination. Therefore, the data for all three years were combined for most of the analysis presented. In order to give each gin weight in the sample equivalent to the amount of data obtained from it, the data were converted to a gin-year basis.

Thus, the total number of gins in the combined sample was obtained by weighing each gin by the number of years in the sample. A gin which was in the sample all three years was counted as three gins.

A gin in the sample two years was counted as two gins and a gin in the sample one year was counted as one gin.

An analytical procedure employed was what might be termed descriptive analysis. For the most part, the survey data are summarized according to various cross classification schemes. Because of the stratification employed and the random selection of sample gins in each class (except the class containing green boll traps and magnets in combination), the results provide information reasonably representative of all gins in Oklahoma under similar situations. Consequently, the information is sufficient for the practical purpose of drawing tentative conclusions regarding the specific objectives of the study.

Limitations of the Study

There are a few factors which should be considered in applying the findings of this study. By coincidence, the three year period of this study is the same as that during which the Federal Soil Bank Program was in effect. Therefore the volume of ginning for the sample gins is lower than would be expected in the absence of such programs.

According to the survey, the four gins with magnets and green boll traps formed the entire population of these gins in the state in 1955 and therefore these are the only four gins of this classification included in the study. It would have been desirable to have a larger number of gins in this class to fully evaluate the effectiveness of this device. It would probably be desirable to have observations over a longer period of time if recommendations of an actuarial nature are to be made. However, the results for the three year period

of this study should indicate the potentialities or lack thereof of the devices.

CHAPTER II

THE INCIDENCE OF FIRES IN COTTON GINS

This chapter contains a description and analysis of the frequency,
causes, and location of fires and associated losses in the sample gins
during the three seasons of 1956-57, 1957-58 and 1958-59.

Many factors influence the frequency and extent of fires in
cotton gins and the losses therefrom. Among the more important fac-
tors are the type of buildings, the amount of cleaning and drying
equipment, the volume of cotton ginned, the types of fire preventive
devices present, and, perhaps most important of all, the care exercised
by management to safeguard against fires. However, these factors are
often so interrelated that it is difficult to separate the effects and
attribute them to a single factor.

It seems logical to expect more fires in the more elaborately
equipped gins because the cotton is subjected to more operations and
this increases the possibility of a fire. Also, losses from fires in
the more elaborately equipped gins would be expected to be greater
because of the more expensive equipment subject to damage from fires.
The volume of ginning would affect the frequency of and loss from
fires because as more cotton is ginned the opportunity for a fire to
start is increased. Also, the more the machinery is operated the great-
er is the friction and wear which in turn would tend to increase the
occurrence of fires.

However, it is likely that the volume of ginning and the amount
of equipment is positively correlated. The cleaning equipment is used

to give a cleaner, better quality bale. When a gin with more equipment is convenient for a cotton grower to use, he would likely prefer this gin over a gin with less cleaning and drying equipment. This adds to the difficulty of isolating the effects of either factor on the occurrence of fires.

The fire preventive devices used in gins are intended to remove foreign matter such as rocks, metal, and green bolls from the seed cotton before it enters the cleaning and drying equipment. Previous fire records indicate this foreign matter is a cause of a large percentage of fires in gins.[2] If these devices can remove this foreign matter from cotton, the number of fires in gins using these devices should be reduced.

In this chapter, an analysis will be made of the fire experience of the sample gins as a group. The influence of the volume of ginning on fires will also be analyzed. In the next chapter an evaluation of the effect of cleaning and drying equipment and the effect of fire preventive devices on the causes of fires and the losses therefrom, will be made.

The Frequency of and Losses from Fires

Of the 154 gins[3] in the sample, 60 reported no fires and 94 reported a total of 211 fires (Table II). This represents an average

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[2] Handbook of Fire Protection, (National Fire Protection Association, 60 Battery March Street, Boston, Massachusetts) Ninth Edition, p. 338. 1948.

[3] Based on gin years, see p. 7.

TABLE II

GIN FIRE EXPERIENCE FOR SAMPLE GINS, OKLAHOMA, 1956-1958

| Item | Year | | | |
	1956	1957	1958	Total
Number of gins	59	51	44	154
Number of fires	68	84	59	211
Number of fires per gin	1.15	1.65	1.34	1.37
Number of gins having fires	34	37	23	94
Number of bales ginned	77,904	81,152	95,989	255,045
Losses from fires				
Machinery loss	$40,364	$85,150	$ 10	$125,524
No. gins	5	3	1	9
No. fires	5	3	1	9
Building loss	$2,550	$20,000	-	$22,550
No. gins	2	2	0	4
No. fires	2	2	0	4
Subtotal loss	$42,914	$105,150	$ 10	$148,074
Cotton loss	$ 3,495	$ 10,857	$2,469	$ 16,822
No. gins	31	28	18	77
No. fires	53	57	35	145
Gin time loss	$498.81	$932.93	$370.70	$1,802.44
No. gins	30	31	18	79
No. fires	61	68	39	168
Extinguisher material used	$491.10	$886.70	$378.80	$1,756.60
No. gins	20	19	11	50
No. fires	39	32	19	90
Subtotal	$4,484	$12,676.62	$3,218.92	$20,381.29
TOTAL	$47,398.91	$117,827.46	$3,228.92	$168,455.29

of 1.37 fires per gin year. The total estimated loss from these fires was $168,455. However, the extent of the fires ranged from those quickly extinguished and causing no loss to three fires in which the gin building, gin machinery, and cotton on the bale yard were a total loss. These three fires accounted for $149,750, or 88.9 percent of the total estimated loss from all fires. A single fire resulting in a loss of $56,700 accounted for one-third of all losses during the three-year period.

Only 41 of the fires caused an estimated loss of $100 or more each. Thirty-seven of these fires had building, machinery and cotton loss of more than $100 each. The building, machinery and cotton loss for the other four fires was less than $100 but the estimated loss in Gin Time and Fire Extinguisher Material used caused the total loss to be greater than $100.

Many of the insurance policies were written with a $100 deductible clause.[4] Since the fire insurance covers only building, machinery, and cotton loss, thirty seven of the 211 fires would have caused enough loss for the insurance company to pay damages under this clause, had it been in affect on all insurance policies.

The losses from fires were classified into those due to gin buildings, gin machinery, cotton, gin down time, and extinguisher material used (Table II). In terms of this classification, the loss in gin machinery of $125,524 was by far the largest loss. This represented 74.5 percent of all losses. However, as in the case of total losses,

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[4] A $100 deductible clause required the gin to pay the first $100 of any loss and the insurance company will pay all loss above $100 up to the total value insured.

practically all of the machinery loss occurred in the three fires

mentioned in the preceding paragraph. These three fires accounted for

all but $524 of the total estimated machinery loss.

The second largest item of loss was the $22,500 associated with

gin buildings. All of this loss was reported in the three fires

discussed previously.

The average loss per gin per year for the three-year period was

$1,093 (Table III). During the 1957 season in which two gins burned

completely, the average loss per gin was $2,310. However, in 1958,

when no fires were reported with a total loss, the average loss per

gin dropped to $73 per gin.

TABLE III

AVERAGE LOSS FROM FIRES PER GIN FOR SAMPLE GINS,
OKLAHOMA, 1956-1958

| Type of Loss | Year | | | |
	1956	1957	1958	Total
Machinery loss	$684.14	$1,669.61	$0.23	$815.09
Building loss	43.22	392.16	--	146.43
Cotton loss	59.24	212.90	56.12	109.24
Gin time loss	8.45	18.29	8.42	11.70
Extinguisher material used	8.32	17.39	8.61	11.41
Total Loss per Gin	$813.37	$2,310.35	$73.38	$1,093.87

The average loss per fire for the three-year period was $798

(Table IV). Once again, however, the influence of the three fires

which resulted in a total loss may give a somewhat distorted picture.

For example, the loss per fire in 1958 when there was no complete loss reported by sample gins was only $54.73. In contrast, in 1957 when two gins suffered a complete loss the loss per fire was $1,402.72.

Losses were computed also on an average loss per bale ginned per year basis (Table V). For the three-year period, the average loss per bale ginned per year was 66 cents. Again, the influence of the three fires resulting in total loss is emphasized. Machinery loss, which was almost completely accounted for by the three total loss fires, represented 49 cents of the 66 cents average loss per bale ginned. The influence of these fires is brought into sharp focus also when a comparison of the loss per bale ginned is made for the three years separately. The loss per bale ginned was only 3.36 cents in 1958 but was 61 cents in 1956 and $1.45 in 1957.

TABLE IV

LOSS FROM FIRES PER FIRE FOR SAMPLE GINS, OKLAHOMA, 1956-1958

| Type of Loss | Year | | | |
	1956	1957	1958	Total
Machinery loss	$593.59	$1,013.69	$ 0.17	$594.86
Building loss	37.50	238.09	--	106.86
Cotton loss	51.40	129.26	41.58	79.72
Gin time loss	7.33	11.11	6.29	8.54
Extinguisher material used	7.22	10.56	6.42	8.33
Total loss per fire	$697.04	$1,402.71	$54.73	$798.31

TABLE V

LOSS FROM FIRE PER BALE GINNED FOR SAMPLE GINS, OKLAHOMA, 1956-1958

Type of Loss	Year			
	1956	1957	1958	Total
Machinery loss	$.5181	$1.0493	$.0001	$.4922
Building loss	.0327	0.2464	--	.0884
Cotton loss	.0449	0.1338	.0257	.0659
Gin time loss	.0064	0.0115	.0039	.0071
Extinguisher material used	.0063	0.0109	.0039	.0069
Total loss per bale ginned	$0.6084	$1.4519	$.0336	$.6605

The Probable Cause and Location of Fires

Gin managers were asked to indicate on the fire report cards (Appendix A) the probable cause and the location in the gin where the fire was first noticed. A summary of these data is shown in Table VI. Frequently, more than one cause was reported for a single fire. Occasionally a fire was noticed in more than one place at the same time.

The cause of over one-fourth of all fires was reported to be unknown. This apparently indicates that ginners could not determine what caused the fire in some cases. However, the percentage of fires caused by unknown factors seems high. Moreover, some gin operators reported the cause of most of their fires as unknown, while others reported practically all fires to be the result of specific causes. This raises the question as to whether some operators actually made an attempt to discover the cause of some fires.

TABLE VI

THE PLACE OF OCCURRENCE AND PROBABLE CAUSE OF 211 FIRES REPORTED BY SAMPLE GINS,
OKLAHOMA, DURING 1956, 1957, AND 1958*

Location	Matches	Smoking	Rocks	Metal	Friction in roll box	Mechanical failure	Overheating in dryer	Defective wiring	Static electricity	Sparks	Choke up	Knot in ribs	Unknown	Other	TOTAL	Percent of total
Wagon on yard	1	2	-	-	-	-	-	-	-	6	-	-	1	-	10	4.4
Cotton house	-	1	-	-	-	-	-	-	-	1	-	-	-	-	2	.9
Drier	1	-	-	-	-	-	1	-	-	-	1	-	1	-	4	1.8
Separator	1	-	1	3	1	-	-	-	-	-	1	-	1	1	9	4.0
Overhead cleaners	26	-	7	3	-	-	1	-	-	-	-	-	8	2	47	20.8
Burr extractor	4	-	1	1	-	1	-	-	-	-	1	-	7	-	15	6.6
Conveyer	10	-	2	4	-	-	1	-	1	1	-	-	4	1	24	10.6
Gin stands	8	-	3	-	12	-	-	-	-	-	2	3	16	2	46	20.4
Lint cleaners	-	-	-	-	1	-	-	-	-	-	-	2	1	-	4	1.8
Condenser	1	-	2	-	-	-	-	-	-	1	1	1	4	1	11	4.9
Press box	4	-	-	1	2	-	1	-	-	2	-	-	4	-	14	6.2
Bale platform or yard	-	-	1	2	4	-	-	-	-	2	1	-	8	1	19	8.4
More than one	3	-	1	1	-	-	-	-	-	-	-	-	2	1	8	3.5
Other and unknown	3	-	2	1	2	-	-	-	1	2	-	-	2	-	13	5.6
TOTAL	62	3	20	16	22	1	4	-	2	15	7	6	59	9	226*	
Percent	27.4	1.3	8.8	7.0	9.7	.4	1.8	0	.88	6.6	3.1	2.7	26.1	4.0		

*In some cases fires were believed caused by more than one specific cause, therefore, the number of believed causes totals more than the actual number of fires.

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Matches in the seed cotton caused the largest number of fires. Sixty-two fires, or 27.4 percent of all reported causes of fires were attributed to matches. Most of the fires caused by matches were first noticed in the overhead cleaners and conveyor. Friction in the roll box was the next most important cause of fires, accounting for 9.7 percent of all causes reported. Most of these fires were first noticed in the gin stands. Rocks in the seed cotton accounted for 8.8 percent and metal in seed cotton accounted for 7.0 percent of the reported causes of fires. These causes were followed closely by sparks which accounted for 6.6 percent of all causes of fires. The fires caused by rocks, metal and sparks were first noticed in a wide variety of places, although more fires caused by rocks were first noticed in the gin stands than any other location.

Fires were noticed first most frequently in the gin stands and over-head cleaners. About 41 percent of all fires were first noticed in these two places combined, each representing a little over 20 percent of the reported places of fires. The next most frequent place for a fire to be noticed first was in the conveyor where about 10 percent of the fires were first noticed. The remaining 50 percent of the fires were first noticed in a wide variety of places. In comparison to the 26 percent of the fires which were reported originating from unknown causes, only about 6 percent of the fires were reported to have started in places other than those listed in Table VI.

The Relation of Volume Ginned and the Incidence of Fires

Frequency of Fires

It was expected that as the number of bales ginned per season in-creased, the occurrence of fires would also increase.[5] It was also expected that the loss from fires would be related to the volume ginned per season. Table VII shows the sample gins classified by the number of bales ginned per season and the associated losses from fires.

The total bales ginned for the three seasons was 255,045 bales, or an average of 1,656 bales per gin per season. Sixty-one gins in the sample ginned less than 1,000 bales per season, 47 ginned between 1,000 and 2,000 bales per season, 28 ginned between 2,000 and 3,000 bales per season and 18 ginned over 3,000 bales per season. The highest number of bales ginned in one season by any gin was 7,300.

For the three-year period, there was an average of 1.37 fires per gin per year and the average number of bales ginned per fire was 1,209 bales. The average number of fires per gin per year was .87 fires for the gins with less than 1,000 bales ginned per season and increased for each increase in volume class to an average of 3.22 fires per gin per year for the gins with a volume of 3,000 or more bales ginned per season. The average bales ginned per fire was 659 bales for the gins with less than 1,000 bales ginned per season and increased for each class to an average of 1,445 bales per fire for the gins with over 3,000 bales ginned per season. These data show that as the number of bales ginned per season

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[5]The simple correlation coefficient (r) between volume of ginning and occurrence of fires was calculated to be .425. This was found to be significant at the one percent level.

TABLE VII

INCIDENCE OF FIRES AND FIRE LOSSES BY VOLUME OF GINNING
CLASSES, SAMPLE GINS, OKLAHOMA, 1956-1958

| Item | Number of Bales | | | |
	Less than 1,000	1,001- 2,000	2,001- 3,000	Over 3,000
Number of gins	61	47	28	18
Number of fires	53	52	48	58
Total bales ginned	34,901	67,170	69,169	83,805
Average bales per gin	572	1,429	2,470	4,656
Average fires per gin	.87	1.11	1.71	3.22
Average number of bales per fire	659	1,291	1,441	1,445
Building and Machinery Loss (dollars)				
Total	92,784.00	50.00	55,240.00	--
Average per gin	1,521.05	1.06	1,972.85	--
Average per fire	1,750.05	0.96	1,150.83	--
Average per bale	2.650	.007	.7987	--
Cotton, Gin Time, and Extinguisher Material Used Loss (dollars)				
Total	10,348.26	2,320.05	4,708.91	2,779.72
Average per gin	169.64	49.36	168.19	154.43
Average per fire	195.26	44.62	98.10	49.64
Average per bale	.295	.0345	.0247	.0331
Total Loss All Sources (dollars)				
Total	103,132.46	2,370.05	59,948.91	2,779.72
Average per gin	1,690.69	50.42	2,141.03	154.43
Average per fire	1,945.31	45.58	1,249.93	49.64
Average per bale	2.953	.0352	.8234	.0331

increases, the average number of fires per gin increases. But they also show that as the volume ginned increases the number of fires per bale ginned decreases, although the difference between the two largest classes is obviously not significant.

Losses from Fires

When losses from fires were calculated for the gins classified by volume of ginning, the results formed a fluctuating pattern from which few conclusions could be drawn (Table VII). One possible reason for this may have been that volume was considered for an entire season and the losses from fires may have affected the season volume in some instances. This is especially true if the result of the loss was damage to vital machinery or an entire gin so that the gin had to close down for a period of time or for the rest of the season. The rate of ginning at the time of the fire may have been sufficiently high that the total volume for the season would have placed the gin in a higher volume class in the absence of the fire.

Two gins in the class that ginned less than 1,000 bales per season were completely destroyed by fire in early September. Their ginning volume had they operated for the entire season is not known, but it probably would have been much higher had the fire not occurred. The loss associated with these two fires is so large relative to the total loss for all gins that the loss for this volume class is relatively high. There was also one gin in the 2,000 to 3,000 bale per season volume class which burned after the season had closed. Obviously, there was no relation between the volume ginned and the occurrence of this fire.

The losses associated with these three fires were mainly losses of gin buildings and machinery. Since these three fires cannot be accurately associated with the volume ginned, the data has been subtotaled into machinery and building loss and cotton loss, gin time loss and extinguisher material loss. The sub-total of cotton loss, gin time loss and extinguisher material used may be a more meaningful measure of the association between volume ginned and losses from fires.

In addition to total losses from fires for the sample gins classified by the number of bales ginned per year, Table VII also shows average losses per gin, per fire and per bale ginned. There was no consistent relationship between any of these measures of losses from fires and the quantity ginned as represented by the volume classification.

CHAPTER III

THE EFFECT OF FIRE PREVENTIVE DEVICES AND THE AMOUNT OF CLEANING
AND DRYING EQUIPMENT ON THE INCIDENCE OF FIRES

This chapter is devoted to an attempt to evaluate the effects of
fire preventive devices and the amount of cleaning and drying equip-
ment on the incidence of gin fires. First, the data on all fires exper-
ienced by the sample gins are classified and analyzed by the type of fire
preventive devices and by amount of cleaning and drying equipment. How-
ever, some fires were reported which neither of the above factors could
have influenced. For example, some fires were started by sparks getting
into seed cotton in wagons on the yard and one fire was started in a gin
after the ginning season was over. Therefore, the losses from fires which
could not be associated to the above factors were subtracted from total
loss and the data were reevaluated for the effect of these factors.

The Effects of Fire Preventive Devices[6]

As pointed out in the previous chapter, the sample contained only
three classes of gins based on fire preventive devices in use: (1) a
control group of gins with no devices, (2) gins with green boll traps
only, and (3) gins with magnets and green boll traps in combination.

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[6]The data shown in the tables in this chapter are summaries of more
complete tables presented in Appendix B. The appendix tables present
detailed data regarding fire experience of the sample gins for the indi-
vidual years and for the three-year period combined with the gins classi-
fied by the amount of cleaning and drying equipment and fire-preventive
devices in use.

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For the three-year period, there were 71 gins in the sample of the control group, 71 equipped with green boll traps only, and 12 equipped with both magnets and green boll traps (Table VIII).[7] The gins within each of these classes reported an average of 1.18, 1.31 and 2.83 fires per gin, respectively. However, since the average number of bales ginned per gin per year was smallest for those gins with no devices and largest for those with both green boll traps and magnets, the average number of bales per fire was approximately the same for each classification.

TABLE VIII

INCIDENCE OF FIRES BY FIRE PREVENTIVE DEVICES,
SAMPLE GINS, OKLAHOMA, 1956-58

Item	Type of Fire Preventive Device		
	No Device	Green Boll Trap	Magnets and Green Boll Trap
Number of gins (no.)	71	71	12
Fires per gin (no.)	1.18	1.31	2.83
Bales per gin (no.)	1,432	1,668	2,913
Bales per fire (no.)	1,210	1,273	1,028
Losses from fires (dollars)			
Loss per gin	851.42	1,504.34	100.17
Loss per fire	719.64	1,148.47	35.35
Loss per bale	0.595	0.902	0.034

Source: Appendix B, Table IV.

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[7]Gin numbers refer to gin years, i.e., a gin in the sample all three years is counted as three gins.

Losses from Fires

The average loss per gin, per fire, and per bale ginned for the gins

in each classification are also shown in Table IX. In each case, the

loss is highest for the class of gins with green boll traps alone and

lowest for the class with green boll traps and magnets in combination.

However, two gins with green boll traps and one gin in the control

group were destroyed completely by fire. Building and machinery losses

associated with these three fires accounts for practically all building

and machinery loss for the entire sample. Moreover, this building and

machinery loss is a relatively large portion of total fire losses in

all categories. Table IX shows the loss per gin, per fire, and per

bale ginned separated into that part due to damage to buildings and

machinery and that part due to other damage.

When machinery and building losses are excluded, losses are still

lower for those gins having both green boll traps and magnets. However,

in this case, losses are largest for those gins with no devices rather

than for gins with green boll traps alone as was the case when machinery

and building losses were included.

The Frequency of Fires

As would be expected from the low average number of fires per gin,

the frequency of fires in sample gins was low. In all three sample

classes, the majority of the gins had less than two fires per season

(Table X). The largest number of fires for any gin was eight.

In gins with green boll traps, 83 percent of the gins reported

no more than two fires per season. Eighty-seven percent of the gins

with no devices reported no more than two fires per season and 58

percent of the gins with magnets and green boll traps were in this category.

TABLE IX

LOSSES PER GIN, PER FIRE AND PER BALE, CLASSIFIED BY FIRE PREVENTIVE
DEVICES AND TYPE OF LOSS, SAMPLE GINS, OKLAHOMA, 1956-1958

Item	Type of Fire Preventive Device		
	No Device	Green Boll Trap	Magnet and Green Boll Trap
	(Dollars)	(Dollars)	(Dollars)
Loss per gin	851.42	1,504.34	100.17
Buildings and machinery	704.39	1,380.53	4.17
Other[a]	147.03	123.81	96.00
Loss per fire	719.64	1,148.47	35.35
Buildings and machinery	595.37	1,053.94	1.47
Other[a]	124.27	94.53	33.88
Loss per bale	0.595	0.902	0.034
Buildings and machinery	0.492	0.828	0.001
Other[a]	0.103	0.074	0.033

[a]Includes loss of cotton, gin down time and fire extinguisher material used.

Source: Appendix B, Table IV.

TABLE X

FREQUENCY OF OCCURRENCE OF FIRES BY TYPES OF FIRE PREVENTIVE
DEVICES, SAMPLE GINS, OKLAHOMA, 1956-1958

		Number of Fires				
		0	1 & 2	3 & 4	5 & 6	7 & 8
Green boll traps	No. of gins	25	34	11	1	0
	% of gins	35	48	15	1	0
Magnets & green boll traps	No. of gins	1	6	3	1	1
	% of gins	8	50	25	8	8
No device	No. of gins	35	27	3	5	1
	% of gins	49	38	4	7	1

The Probable Cause and Location of Fires

Matches were the major cause of fires (29 percent) in gins with
no fire preventive devices (Table XI), followed closely by unknown
causes (24 percent). Matches also caused 29 percent of the fires in
gins with green boll traps, but unknown causes accounted for 33 percent
of the fires in this classification (Table XII). In gins with both green
boll traps and magnets, matches and friction in the roll box each caused
about 19 percent of the fires (Table XIII). Most of the fires in gins
with no devices and in those with green boll traps occurred in the over-
head cleaners and gin stands. In gins with both devices the location of
the fires was more evenly distributed, although 12.5 percent of the fires
occurred in both the burr extractor and gin stands and 12.5 percent
occurred from unknown causes.

TABLE XI

THE PLACE OF OCCURRENCE AND PROBABLE CAUSE OF FIRES REPORTED BY 71 SAMPLE GINS WITH NO
FIRE DEVICES DURING 1956, 1957, AND 1958

Location	Matches	Smoking	Rocks	Metal	Friction in roll box	Mechanical failure	Overheating in drier	Defective wiring	Static electricity	Sparks	Choke up	Knot in ribs	Unknown	Other	Total	Percent of total
Wagon or Trailer on yard	1	2	-	-	-	-	-	-	-	2	-	-	1	-	6	6
Cotton house	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Drier	1	-	-	-	-	-	1	-	-	-	-	-	1	-	3	3
Separator	-	-	-	1	-	-	-	-	-	-	-	-	-	1	2	2
Overhead cleaners	11	-	4	3	-	-	1	-	-	-	-	-	2	2	23	24
Burr extractor	1	-	1	1	-	-	-	-	-	-	-	-	3	-	6	6
Conveyer	3	-	1	-	-	-	1	-	1	-	-	-	2	1	9	9
Gin stands	1	-	2	1	5	-	-	-	-	-	1	-	8	-	18	19
Lint cleaners	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1
Condenser	1	-	2	-	-	-	-	-	-	-	1	-	1	-	5	5
Press box	3	-	-	-	-	-	-	-	-	1	-	-	-	-	4	4
Bale platform	-	-	-	2	-	-	-	-	-	1	-	-	2	-	5	5
More than one	3	-	-	1	-	-	-	-	-	-	1	-	2	1	8	8
Other and unknown	3	-	2	-	-	-	-	-	-	1	-	-	1	-	7	7
Total	28	2	12	9	5	-	3	-	1	5	3	1	23	5	97	
Percent	29	2	13	9	5	-	3	-	1	5	3	1	24	5		

In some cases fires were believed caused by more than one specific cause, therefore, the number of believed causes totals more than the actual number of fires.

TABLE XII

THE PLACE OF OCCURRENCE AND PROBABLE CAUSE OF FIRES REPORTED BY 71 SAMPLE GINS WITH GREEN BOLL TRAPS DURING 1956, 1957, AND 1958

	Believed Causes															
	Matches	Smoking	Rocks	Metal	Friction in roll box	Mechanical failure	Overheating in drier	Defective wiring	Static electricity	Sparks	Choke up	Knot in ribs	Unknown	Other	Total	Percent of total
Wagon or trailer on yard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cotton house	-	1	-	-	-	-	-	-	-	1	-	-	-	-	2	2
Drier	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
Separator	1	-	1	2	-	-	-	-	-	-	1	-	1	-	6	6
Overhead cleaner	13	-	2	-	-	-	-	-	-	-	-	-	6	2	23	24
Burr extractor	1	-	-	-	-	1	-	-	-	-	1	-	3	-	6	6
Conveyer	6	-	-	-	-	-	-	-	-	1	-	-	1	1	9	9
Gin stands	6	-	1	2	7	-	-	-	-	-	1	1	8	-	26	27
Lint cleaners	-	-	-	-	-	-	-	-	-	-	-	1	1	-	2	2
Condenser	-	-	-	-	-	-	-	-	-	-	-	1	3	-	4	4
Press box	1	-	-	1	1	-	-	-	-	1	-	-	3	-	7	7
Bale platform or yard	-	-	1	-	2	-	-	-	-	-	-	-	6	1	10	10
More than one	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other and unknown	-	-	-	-	1	-	-	-	-	1	-	-	-	-	2	2
Total	28	1	5	5	11	1	-	-	-	4	4	3	32	4	98	
Percent	29	1	5	5	11	1	-	-	-	4	4	3	33	4		

In some cases fire were believed caused by more than one specific cause, therefore, the number of believed causes totals more than the actual number of fires.

TABLE XIII

THE PLACE OF OCCURRENCE AND PROBABLE CAUSE OF FIRES REPORTED BY 12 SAMPLE GINS WITH GREEN BOLL TRAPS AND MAGNETS DURING 1956, 1957, AND 1958

Location	Believed Causes															
	Matches	Smoking	Rocks	Metal	Friction in roll box	Mechanical failure	Overheating	Defective wiring	Static electricity	Sparks	Choke up	Knot in ribs	Unknown	Other	Total	Percent of total
Wagon or trailer on yard	-	-	-	-	-	-	-	-	-	4	-	-	-	-	4	12.5
Cotton house	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Drier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Separator	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	3.1
Overhead cleaners	2	-	1	-	-	-	-	-	-	-	-	-	-	-	3	9.3
Burr extractor	2	-	-	-	-	1	-	-	-	-	-	-	-	1	4	12.5
Conveyer	1	-	1	-	-	-	-	-	-	-	-	-	-	1	3	9.3
Gin stands	1	-	-	1	-	-	-	-	-	-	-	2	-	-	4	12.5
Lint cleaners	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	3.1
Condenser	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	3.1
Press box	-	-	-	-	1	-	1	-	-	1	-	-	-	1	3	9.3
Bale platform	-	-	-	-	2	-	-	-	-	1	-	-	-	-	3	9.3
More than one	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	3.1
Other and unknown	-	-	-	1	1	-	-	-	1	-	-	-	1	-	4	12.5
Total	6	-	3	2	6	1	1	-	1	6	-	2	1	3	32	
Percent	18.8	9.3	6.3	18.3	3	3.1	-	3.1	18.8	-	6.3	3.1	9.3			

In some cases fires were believed caused by more than one specific cause, therefore, the number of believed causes totals more than the actual number of fires.

Rocks and metal caused ten fires in gins with green boll traps
and five fires in gins with both green boll traps and magnets. Since
the devices were designed to eliminate these causes, it is evident
that they were not fully effective in doing so. Apparently, however,
they were partially effective. The gins with no devices reported 21
fires caused by metal and rocks. On a percentage basis, rocks and
metal caused 22 percent of the fires in gins with no devices, 10 per-
cent in gins with green boll traps, and about 16 percent in gins with
both devices. When the two groups of gins with devices are combined,
rocks and metal caused only 11.5 percent of all fires in the combined
group.

However, there was little difference in the percentage of fires
caused by metal in the gins with only green boll traps (five percent)
and in those gins with magnets in addition to green boll traps (six
percent). Metal caused nine percent of the fires in gins with no
devices. This seems to indicate that green boll traps were about as
effective in removing metal from seed cotton in the sample gins as
were magnets, that most of the metal that causes gin fires is heavy
enough to be eliminated by boll traps, or there were few pieces of
metal in the cotton ginned by sample gins.

Thirty-one[8] fires were caused by friction in the roll box, choke-
ups, and knots in ribs. While the exact cause of these events is not
known, it is known that green bolls contribute indirectly to these
causes of fires. However, gins with no devices for removing green bolls

[8]Tables XI, XII and XIII show that 35 fires were believed caused by
friction in the roll box, choke ups and knots in ribs. However, in four
instances, fires were reported to be caused by combinations of these
causes, so the actual number of fires was 31.

reported a smaller percentage of fires resulting from these three causes combined (nine percent) than did those gins with devices. Gins equipped with green boll traps only reported 18 percent of all fires caused by these three factors and gins with both green boll traps and magnets in combination reported 25 percent of all fires caused by the three factors combined (Tables XI, XII and XIII).

Since magnets are not designed to remove green bolls, the data for the two groups with green boll traps were combined. When this was done, the three causes combined still accounted for 20 percent of all fires in those gins with green boll traps.

Loss from Fires Associated with Causes which Fire Preventive Devices Were Designed to Eliminate

The fire preventive devices used in the sample gins were not over-all preventive devices and many fires occurred for which these devices had no influence or control. The devices were designed to remove foreign matter such as rock, metal and green bolls from the seed cotton.

There were 36 fires reported by the sample gins which were believed started by rocks and metal--a cause which the devices should control. Thirty-one additional fires were believed caused by friction in the roll box, choke ups and knots in ribs. Green bolls could indirectly contribute to these causes. It is evident therefore that 67 fires were believed started by factors the fire preventive devices were designed to directly or indirectly control.

Twenty-nine of these fires were in gins with green boll traps (Table XIV). Twelve were in gins with magnets and green boll traps and 26 were in gins with no devices. When the data for these causes were summarized,

one gin, with no devices was a total loss. The losses in the other

fires were small. Therefore the loss per gin, loss per fire and loss

per bale ginned were much lower in the classes with fire preventive

devices.

TABLE XIV

LOSSES FROM FIRES BY TYPE OF FIRE PREVENTIVE DEVICES FOR FIRES
STARTED BY CAUSES THE DEVICES WERE DESIGNED TO ELIMINATE,
SAMPLE GINS, OKLAHOMA, 1956-1958

| Item | Type of Fire Preventive Device | | |
	No Device	Green Boll Trap	Magnet and Green Boll Trap
Number of gins	71	71	12
Number of fires	26	29	12
Number of bales ginned	101,660	118,424	34,961
Loss from fires			
Machinery loss	40,000.00	454.00	--
Building loss	10,000.00	--	--
Cotton loss	929.30	984.40	373.00
Gin time loss	126.70	183.46	213.54
Extinguisher material used	75.05	323.95	21.00
Total Loss	51,131.05	1,945.81	607.54
Average loss per gin	720.16	27.41	50.63
Average loss per fire	1,966.58	67.10	50.63
Average loss per bale ginned	.503	.016	.017

The Effect of Equipment on Fire and Fire Losses

One of the factors expected to affect the occurrence of fires and

losses from these fires was the amount of equipment. Although the

effect of other factors cannot be completely separated from the effect

of equipment, the data are analyzed by equipment classification in this

section. Since there were no simply equipped gins in Oklahoma, the
only two groups in the study were gins with moderate equipment and
elaborate equipment.

There were 62 moderately equipped gins and 92 elaborately equip-
ped gins in the sample (Table XV). The moderate gins reported 69 fires
for an average of 1.11 fires per gin. The elaborately equipped gins
reported 142 fires for an average of 1.52 fires per gin.

Thirty-three moderately equipped gins (47 percent) during 1956,
1957 or 1958 went through a complete season without a single gin fire.
Thirty-one elaborately equipped gins (34 percent) ginned a full season
without experiencing a fire.

TABLE XV

INCIDENCE OF FIRES IN SAMPLE GINS CLASSIFIED BY THE AMOUNT OF
CLEANING AND DRYING EQUIPMENT, OKLAHOMA, 1956-1958

| Item | Amount of Equipment | |
	Moderate	Elaborate
Number of gins	62	92
Number of fires	69	142
Fires per gin	1.11	1.52
Gins having fires	33	61
Bales per gin	1,056	2,051
Bales per fire	949	1,335

Thus, the elaborately equipped gins had a higher average number
of fires per year per gin than did the moderately equipped gins and
also had a higher percentage of gins having at least one fire during

a ginning season. However, they also ginned a larger number of bales per year (2,051) than did the moderately equipped gins (1,056). As a result, the average number of bales ginned per fire was greater from the elaborate gins (1,335) than for the moderate gins (949).

Losses from Fires

The average loss per gin per year was greater for the elaborately equipped gins ($1,178.61) than for the moderately equipped gins ($968.19). However, the loss per fire and the loss per bale was greater for the moderate equipped gins (Table XVI). For the moderately equipped and elaborately equipped gins, respectively, the average loss per fire was $869.98 and $763.55, and the average loss per bale ginned per year was $0.92 and $0.57. In every case buildings and machinery accounted for a preponderant share of total losses.

TABLE XVI

LOSSES FROM FIRES IN SAMPLE GINS CLASSIFIED BY AMOUNT OF
CLEANING AND DRYING EQUIPMENT, OKLAHOMA, 1956-1958

	Amount of Equipment	
Item	Moderate	Elaborate
	(dollars)	(dollars)
Losses per gin	$968.19	$1,178.61
Building and machinery	810.71	1,063.20
Other[a]	157.48	115.41
Loss per fire	869.98	763.55
Building and machinery	728.48	688.78
Other[a]	141.50	74.77
Loss per bale	0.917	0.572
Buildings and machinery	0.768	0.516
Other[a]	0.149	0.056

[a]Includes loss of cotton, gin down time, and fire extinguisher material used.

Source: Appendix B, Table IV.

However, there were some fires reported which were not associated with the amount of equipment in the gin. These fires could not be attributed to the presence of any equipment. Fires which were considered in this category were fires started by sparks from the burr burner, fires in the cotton house, seed cotton fires in wagons on the yard, and fire in the gin after the season closed. Thirteen fires resulted from these causes combined with a total loss of $52,565.82. This loss was subtracted from the total loss to give the loss from fires which might be expected to be related to the amount of equipment (Table XVII). When this adjustment was made, the difference in per fire and per bale losses between the two groups was even greater. Moreover, moderately equipped gins now show a greater loss per gin than do elaborately equipped gins.

TABLE XVII

LOSSES FROM FIRES FOR WHICH EQUIPMENT COULD HAVE HAD AN EFFECT
BY TYPES OF EQUIPMENT, SAMPLE GINS, OKLAHOMA, 1956-1958

| Item | Amount of Equipment | |
	Moderate	Elaborate
Total gins	62	92
Total fires	65	133
Total bales	65,460	189,585
Loss		
Machinery loss	$40,264.00	$45,260.00
Building loss	10,000.00	2,500.00
Cotton loss	8,414.03	5,869.05
Gin time loss	401.50	1,253.34
Extinguisher material used	734.26	979.34
Total	$59,814.29	$55,861.73
Average loss per gin	964.75	607.19
Average loss per fire	920.22	420.00
Average loss per bale	.914	.295

CHAPTER IV

INSURANCE PAID AND CLAIMS COLLECTED FOR SAMPLE GINS

Insurance expense is an important item in the cost of operation for Oklahoma cotton gins. Insurance was used by all but four of the sample gins in the survey as the method of shifting the risk of loss from fire. These four gins were owned by a large cotton oil company. This company owned several gins and chose to assume the risk of loss from fires.

Several of the gin operators, including some who were single gin owners, did not carry insurance on the seed or baled cotton on yard. In most of these cases, the cotton was removed from the yard as soon as possible after ginning. The amount of cotton on the yard at any one time was small enough for the operator to assume the risk of loss.

Building and Machinery Insurance

Determination of Rates

The premium on the insurance coverage for each gin is a function of the amount of coverage and insurance rate. There are many considerations which determine the rate. The primary one is the type of building construction. For insurance purposes, cotton gins are classified as combustible or noncombustible. Combustible buildings include those with wood frame construction. Noncombustible buildings include those with all-metal or masonry construction.

The insurance rate for an individual gin is determined by an inspector for the insurance company. He uses a set of rates which is

established by the insurance company, or a rating bureau to which the company subscribes.[9] These are approved by the Oklahoma Insurance Commission and are filed with the Commission. Starting with the base rate for the type of building construction, the rate is adjusted for the individual gin. Credit is made for equipment, construction, or management practices which would decrease the chance of occurrence of fires and fire losses. Charges are made for any equipment, construction or management practices which would increase the chance of fire and fire loss. The final rate obtained would be applicable only to the gin inspected and would probably be different for any two gins.

The Oklahoma Rating Bureau, which establishes the rates used by many companies in the state, is owned by the companies which subscribe to its services. Stock or mutual companies who subscribe are subject to the regulations and rates which are established by the bureau and filed with the Oklahoma Insurance Commission. Insurance companies may operate in the state without subscribing to the services of the Bureau. These companies must establish and file their rates individually with the Insurance Commission.

Insurance Coverage of Sample Gins

For the three-year period there were 142 gins which reported insurance coverage on buildings and machinery. Sixty of these gins were classified as noncombustible. Eighty-two of the gins were classified as combustible. The percent of the value of the buildings and machinery

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[9]The set of rates established and used by the Oklahoma Inspection Bureau, Oklahoma City, Oklahoma is shown in Appendix C.

that was covered by insurance ranged from 30 percent to 100 percent.

The distribution of the percent of coverage is shown in Table XVIII.

TABLE XVIII

NUMBER OF GINS BY PERCENT OF VALUE COVERED BY INSURANCE AND TYPE OF
CONSTRUCTION, 142 SAMPLE GINS, OKLAHOMA, 1956-1958

Type of Construction	Percent of Value Insured				Total Amount
	20 to 40	40 to 60	60 to 80	80 to 100	
Combustible	6	5	26	45	82
Noncombustible	3	0	21	36	60
Total Gins	9	5	47	81	142

The average percent of the value which was covered by insurance was
approximately the same for combustible gins (79 percent) and non-combus-
tible gins (78 percent). However, the average value of noncombustible
gins was $108,842 while the average value of the combustible gins was
only $60,678 (Table XX). Consequently, the average amount of coverage
was much higher for noncombustible gins.

The average insurance coverage for combustible gins was $47,962
while the average insurance coverage for non-combustible gins was $85,144.

Insurance Rates

The average rate per year for the three-year period for non-com-
bustible gins was $1.184 per $100 valuation (Table XIX). The average
rate for combustible gins was $3.329 per $100 valuation. This average
rate includes both the fire rate and the rate for the extended cover-
age of wind, hail and other damages.

TABLE XIX

AVERAGE INSURANCE RATES FOR BUILDING AND MACHINERY BY TYPE OF
CONSTRUCTION FOR SAMPLE GINS, OKLAHOMA, 1956, 1957, 1958

| Year | Type of Construction | |
	Combustible	Non-combustible
	(Dollars per $100 Valuation)	
1956	3.414	1.222
1957	3.251	1.206
1958	3.285	1.124
3-Year Average	3.329	1.184

The decline in the average rate each year was probably due to the
closing of the more dilapidated gins which would carry a higher risk
of loss and a higher rate. Several of the gins were remodeled and
newer all-metal equipment was added. This would also tend to lower the
rate applicable to the gin.

A separate analysis of the fire rate and extended coverage rate
was impossible for two reasons. The data in the survey were separated
into fire and extended coverage rates only for the 1956 season. Also
several of the gins were owned by a cotton oil company which was also
the primary owner of stock in a mutual insurance company. This insur-
ance company wrote the insurance for all of the gins owned by the com-
pany. The rates used and quoted included both the fire and extended
coverage rate. The individual gins did not have the rates separated.

The premium rates for noncombustible gins ranged from $.85 to $1.67.
The rates for combustible gins ranged from $1.32 to $6.05 (Table XXI).

The rates for noncombustible gins were very closely grouped together. The large majority of the rates in the group between $1.00 and $1.50 were below $1.15.

TABLE XX

THE AVERAGE VALUE, AVERAGE INSURANCE COVERAGE, AND COVERAGE AS A
PERCENT OF VALUE FOR SAMPLE GINS BY TYPE OF CONSTRUCTION,
OKLAHOMA, 1956, 1957, 1958

Average	Type of Construction	
Per Year	Combustible	Non-combustible
1956		
Average gin value	$58,457	$105,125
Average insurance coverage	$45,754	$ 80,492
Percent of value insured	78	77
1957		
Average gin value	$63,556	$108,850
Average insurance coverage	$48,957	$ 85,232
Percent of value insured	77	78
1958		
Average gin value	$60,679	$112,550
Average insurance coverage	$50,618	$ 89,709
Percent of value insured	83	80
Three-year Average		
Average gin value	$60,678	$108,842
Average insurance coverage	$47,962	$ 85,144
Percent of value insured	79	78

The reasons for the wide range in rates for combustible gins were hard to determine. The lower rates were explained by the presence of a sprinkler system in the gin. The highest rate was explained by the presence of highly combustible auxiliary buildings nearby and highly combustible businesses in the vicinity. Some of the other variations were probably for the same reasons or similar reasons not explained in the survey.

TABLE XXI

NUMBER OF GINS BY INSURANCE RATE AND TYPE OF CONSTRUCTION FOR
SAMPLE GINS, OKLAHOMA, 1956-1958

Type of Construction	Insurance Rate									
	Less than 1.00	1.00 to 1.50	1.50 to 2.00	2.00 to 2.50	2.50 to 3.00	3.00 to 3.50	3.50 to 4.00	4.00 to 4.50	4.50 to 5.00	Over 5.00
	(Dollars per $100 Valuation)									
Non-Combustible	27	26	7	-	-	-	-	-	-	-
Combustible	-	3	4	2	19	33	6	5	6	3

Premiums Paid and Claims Collected

The 142 insured gins paid a total premium of $100,957.27 (Table XXII). This was an average of $710.97 per gin. Claims collected by these gins totaled $81,740.35 for an average of $575.64 per gin. Hence, 80.9 percent of total premiums was collected as claims.

The 82 gins with combustible buildings collected approximately 98 percent of the total claims collected. In two of the three years, these gins collected claims in excess of the premiums paid. For the three-year period the combustible gins collected claims for losses equivalent

TABLE XXII

PREMIUMS PAID AND CLAIMS COLLECTED; BUILDING AND MACHINERY
INSURANCE, 142 SAMPLE GINS, OKLAHOMA, 1956-1957

Year and Item	Type of Construction		
	Combustible	Non-Combustible	Total
1956			
Number of gins	37	20	57
Total premiums paid ($)	24,508.58	14,102.72	38,611.30
Total claims collected ($)	36,264.00	0	36,264.00
Average premium per gin ($)	662.39	705.14	677.39
Average claim per gin ($)	980.11	0	636.21
Percent of premium collected as claims	148	0	93.9
1957			
Number of gins	26	20	46
Total premiums paid ($)	20,034.25	15,656.35	35,690.60
Total claims collected ($)	43,656.35	0	43,656.35
Average premium per gin ($)	770.55	782.82	775.88
Average claim per gin ($)	1,679.09	0	949.05
Percent of premiums collected as claims	218	0	122.3
1958			
Number of gins	19	20	39
Total premiums paid ($)	12,696.40	13,958.97	26,655.32
Total claims collected ($)	0	1,820.00	1,820.00
Average premium per gin ($)	682.60	697.95	683.47
Average claim per gin ($)	0	91.00	46.67
Percent of premiums collected as claims	0	13	6
Three-year Total			
Number of gins	82	60	142
Premiums paid ($)	57,239.23	43,718.04	100,957.27
Claims collected ($)	79,920.35	1,820.00	81,740.35
Average premium ($)	698.04	728.63	710.97
Average claim ($)	974.64	30.33	575.64
Percent of premiums collected as claims	139.6	4.2	80.9

to 139 percent of the premiums paid. During this period noncombustible

gins collected claims for losses which were only 4.2 percent of the pre-

miums paid.

The large amount of claims collected by combustible gins was due

to the three fires in which the buildings and machinery were a total

loss. The only loss in noncombustible gins was partial damage to one

dryer.

Bale Yard Insurance

Cotton products insurance is carried by gins to cover the risk of

loss to cotton in and around the gin. It is usually carried only for

the period of the ginning season. It is increased or decreased during

the season according to the value of the cotton and products at the

gin.

There were two basic types of insurance used by the sample gins.

With one type, the cotton was insured for a value at least as much as

the cash value of the cotton. The rate for this type of insurance was

a minimum of $3.75 per $100 valuation as established by the Oklahoma

Rating Bureau. However, if the rate for the insurance on the gin

building and machinery exceeded this minimum rate, then the building

rate applies also to the products.

The other type of insurance has a flat rate per bale ginned. This

rate ranged from 12 cents per bale to 25 cents per bale. A report of

the number of bales ginned each day was made to the company. The

insurance covered only the value of these bales.

Bale Yard Premiums and Claims

Bale yard insurance was carried by 129 of the 154 gins in the survey. These gins paid a total of $21,635.84 in premiums for this insurance (Table XXIII). This was an average of $167.72 per gin. These gins collected claims which totaled $9,865.59. This was an average of $76.48 per gin. The total claims collected were 45.6 percent of the total premiums paid for this type insurance.

TABLE XXIII

PREMIUMS PAID AND CLAIMS COLLECTED; BALE YARD INSURANCE, 129
SAMPLE GINS, OKLAHOMA, 1956-1958

Year	Number of gins	Premiums	Claims	Average Premium	Average Claim	Claim as Percent of Premium
1956	52	$5,734.54	$3,845.37	$110.28	$73.95	67.0
1957	40	6,359.29	2,475.89	158.98	61.90	38.9
1958	37	9,542.01	3,544.33	257.89	95.79	37.1
TOTAL	129	$21,635.84	$9,865.59	$167.72	$76.48	45.6

The bale yard premium for individual gins would be based primarily on the volume of ginning. The increase in average premium per gin in 1957 and 1958 is a result of the increase in volume ginned per gin as was pointed out in Chapter II.

Gin Processing Loss

None of the gins in the survey carried any insurance on cotton while it was actually being processed through the gin machinery. Any

loss of cotton from fires in the gin machinery was paid for by the gin owners. The relatively small amount of cotton which would be in any one piece of machinery at the time of a fire made it feasible for the owner to assume this risk.

The sample gins paid claims of about $4,600 for gin processing losses for the three years (Table XXIV). Only 34 of the gins (or 22 percent) suffered losses of cotton during processing which required payments. Most of these losses were small averaging $134 per gin and ranging from $6.00 to $700.00 per gin.

TABLE XXIV

GIN PROCESSING LOSSES PAID BY GIN OWNERS;
SAMPLE GINS, OKLAHOMA, 1956-1958

Data	Year			
	1956	1957	1958	Total
Number of gins having loss	17	13	4	34
Total loss	2,031.98	1,760.27	776.54	4,568.79
Loss per gin	110.53	135.41	194.14	134.38
Range	$9.00-700.00	$6.00-400.00	$10.00-400.00	$6.00-700.00

CHAPTER V

SUMMARY

The study underlying this thesis is a part of a regional marketing study. The major objective of the regional study was to seek the answer to the following question: Do fire preventive devices such as magnets and green boll traps reduce the frequency of or losses from fires in cotton gins? For reasons stated in Chapter I, the Oklahoma phase of the study was confined to the fourteen southwest Oklahoma counties.

There were 59 sample gins in 1956, 51 sample gins in 1957 and 44 sample gins in 1958. Therefore the findings included in this thesis are based on gin experience equivalent to 154 gin years. Over the three year period, the sample gins reported a total of 255,045 bales of cotton ginned, for an average of 1,656 bales per gin per season. They also reported a total of 211 fires with a total estimated loss of $168,455. This was an average loss of $1,094 per gin per year, $798.31 per fire, and $.66 per bale ginned.

Only 41 of the 211 fires caused a loss of more than $100 each. Three of the fires caused a total loss of the gin plant and cotton on the bale yard. In respect to the total estimated loss reported, the loss of $125,524 in machinery was the largest single item of loss.

The average number of fires per gin was 1.37. Eighty-three percent of the gins reported no more than two fires per season. One gin reported seven fires for one season and one gin reported eight fires in one season.

The fires were reported to have been caused by a variety of reasons. The largest single known cause was matches in the seed cotton which caused 27.4 percent of all reported fires. Rocks and metal in the seed cotton caused 15.8 percent of all fires. Other important causes were friction in roll box (9.7 percent), sparks (6.6 percent), and unknown causes (26.1 percent). Forty-one percent of the fires were first noticed in either the gin stands or the overhead cleaners. The remainder were first noticed in a variety of places with the more frequently reported places being the conveyor, the bale platform or yard, the burr extractor, and the press box.

When the gins were classified by the volume of ginning, it was found that as the volume of ginning increased from less than 1,000 bales ginned per season to a volume of over 3,000 bales ginned per season, the average fires per gin increased from .87 fires per gin per season to 3.37 fires per gin per season. But the average bales ginned per fire also increased from 659 bales per fire to 1,445 bales per fire.

When classified by types of fire preventive devices, the gins with green boll traps only had the highest average loss per gin ($1,504), the highest average loss per fire ($1,148), and the highest average loss per bale ginned ($.98). The gins with magnets and green boll traps had the lowest average loss per gin ($100.17), the lowest average loss per fire ($35.35), and the lowest average loss per bale ginned ($.034).

However, some fires were reported that resulted from causes not influenced by the fire preventive devices. When these fire losses were eliminated from the analysis, the gins with no fire preventive devices had the largest average loss per gin, the largest average loss per fire

and the largest average loss per bale ginned. The average loss per bale ginned was approximately the same for the two classes of gins with fire preventive devices.

The data for the two classes of cleaning and drying equipment showed that the elaborately equipped gins had a higher average number of fires per gin, but they also ginned a higher average number of bales per gin and per fire. The average loss per gin was higher for the elaborately equipped gins, but the moderately equipped gins had a higher average loss per fire and a higher average loss per bale ginned.

All but twelve of the sample gins carried insurance on the gin buildings and machinery. For insurance purposes, the gins were classified as combustible or non-combustible. The combustible gins had an average value of $60,678 and an average insurance coverage of $47,962. The non-combustible gins had an average value of $108,842 and an average insurance coverage of $85,144. The average insurance rate for combustible gins was $3.329 per $100 insurance coverage and the average rate for non-combustible gins was $1.184 per $100 insurance coverage.

The combustible gins paid a total of $57,239.23 in premiums. They collected a total of $79,920.35 in claims. The average premium was $698.04 per gin and the average claims collected was $974.64 per gin. The claims collected by combustible gins were 139.6 percent of the premiums paid by these gins.

The non-combustible gins paid a total of $43,718 as premiums. They collected a total of $1,820 as claims. The average premium paid was $728.26 per gin and the average claim collected was $30.33 per gin. The

claims collected by non-combustible gins were only 4.2 percent of the premiums paid by these gins.

Bale yard insurance was carried by 129 of the sample gins. They paid an average premium of $167.72 per gin and collected an average of $76.48 as claims. The claims collected for bale yard losses were 45 percent of the premiums paid for this type of insurance.

The small size of the sample, the limited number of fire preventive device and equipment classifications present in Oklahoma, and the short period of time covered by the study, makes it necessary to use caution in applying the findings or in making inferences from this study. This is true particularly in trying to evaluate the influence of fire preventive devices and amount of cleaning and drying equipment on the frequency of fires and the losses from fires. However, these short comings of this individual study should be overcome when the Oklahoma data are combined with those from other states in the regional analysis.

The Oklahoma study will be useful in helping gin owners to realize the major causes and locations of cotton gin fires. It will also point out the large fire losses incurred by cotton gins and the risk they face from fires. This knowledge may serve as an incentive to gin operators to eliminate some of the causes of fires and to reduce the fire losses.

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APPENDIX A

Gin No._____

COTTON GIN FIRE REPORT

To be Mailed After Each Fire and At End of Each Week		
Date : Time of Day	:	Bale No. at time of fire
:	:	
Cotton Harvested by	:	Weather
Hand / / Machine / /	:	Clear / / Rainy / /

FIRST FIRE NOTICED:

_____ Seed Cotton in Field or Transit
_____ Wagon or Trailer on Yard
_____ Cotton House
_____ Drier
_____ Separator
_____ Overhead Cleaners
_____ Burr Extractor
_____ Conveyor
_____ Gin Stands
_____ Lint Cleaners
_____ Condenser
_____ Press Box
_____ Bale Platform or Yard
         (Does not include fire packs)
_____ Other _____

FIRE BELIEVED CAUSED BY:

_____ Matches
_____ Smoking
_____ Rocks
_____ Metal
_____ Friction in Roll Box
_____ Mechanical Failure
_____ Overheating in Drier
_____ Defective Wiring
_____ Static Electricity
_____ Sparks From_____
_____ Choke-up in_____
_____ Other_____

ESTIMATED LOSS				
Machinery	:	Buildings	:	Cotton
$	:	$	:	$
Ginning time (Hrs. or Min.)	:	Cost of CO_2 for this fire		
	:			
No. in Gin Crew	:	Average Hourly Wage		
	:			

SUMMARY OF GINNING AND FIRE EXPERIENCE CLASSIFIED BY TYPES OF EQUIPMENT AND FIRE PREVENTIVE DEVICES, SAMPLE GINS; OKLAHOMA 1956

	Moderate Equipment			Elaborate Equipment				All Equipment			
	Green Boll Traps	No Device	Total	Green Boll Traps	Green Boll Traps and Magnets	No Device	Total	Green Boll Traps	Green Boll Traps and Magnets	No Device	Total
Number of Gins	11	15	26	14	4	15	33	25	4	30	59
Volume of Ginning											
Total Bales Ginned	12,957	10,772	23,729	17,917	9,311	26,947	54,175	30,874	9,311	37,719	77,904
Number of Bales per Gin	1,178	718	913	1,280	2,328	1,796	1,642	1,235	2,328	1,257	1,320
Fire Experience											
Total Number of Fires	13	10	23	15	13	17	45	28	13	27	68
Bales Ginned per Fire	997	1,077	1,032	1,194	716	1,585	1,204	1,103	716	1,397	1,146
Number of Fires per Gin	1.18	.67	.89	1.07	3.25	1.13	1.36	1.12	3.25	.90	1.15
Number of Gins Having Fires	8	6	14	9	4	7	20	17	4	13	34
Loss from Fires by all Gins							----Dollars----				
Machinery Loss	264.00	--	264.00	40,040.00	50.00	10.00	40,100.00	40,304.00	50.00	10.00	40,364.00
Building Loss	--	--	--	2,550.00	--	--	2,550.00	2,550.00	--	--	2,550.00
Cotton Loss	353.00	373.00	726.00	1,869.00	180.00	720.00	2,769.00	2,222.00	180.00	1,093.00	3,495.00
Gin Time Loss	53.70	76.50	130.20	194.87	80.36	93.38	368.61	248.57	80.36	169.88	498.81
Extinguisher Material Used	93.67	83.09	176.76	108.08	65.00	141.26	314.34	201.75	65.00	224.35	491.10
Total Loss from Fires	764.37	532.59	1,296.96	44,761.95	375.36	964.64	46,101.95	45,526.32	375.36	1,497.23	47,398.91
Loss from Fires per Gin											
Machinery Loss	24.00	--	10.15	2,860.00	12.50	0.67	1,215.15	1,612.16	12.50	0.33	684.14
Building Loss	--	--	--	182.14	--	--	77.27	102.00	--	--	43.22
Cotton Loss	32.09	24.87	27.92	133.50	45.00	48.00	83.91	88.88	45.00	36.43	59.24
Gin Time Loss	4.88	5.10	5.01	13.92	20.09	6.22	11.17	9.94	20.09	5.66	8.45
Extinguisher Material Used	8.52	5.54	6.80	7.72	16.25	9.42	9.53	8.07	16.25	7.48	8.32
Total Loss from Fires	69.49	35.51	49.88	3,197.28	93.84	64.31	1,397.03	1,821.05	93.84	49.90	803.37
Loss from Fires per Fire											
Machinery Loss	20.31	--	11.48	2,669.33	3.85	0.59	891.11	1,439.43	3.85	0.37	593.59
Building Loss	--	--	--	170.00	--	--	56.67	91.07	--	--	37.50
Cotton Loss	27.15	37.30	31.56	124.60	13.85	42.35	61.53	79.36	13.85	40.48	51.40
Gin Time Loss	4.13	7.65	5.66	12.99	6.18	5.49	8.19	8.88	6.18	6.29	7.33
Extinguisher Material Used	7.21	8.31	7.69	7.21	5.00	8.31	6.99	7.20	5.00	8.31	7.22
Total Loss from Fires	58.80	53.26	56.39	2,984.13	28.88	56.74	1,024.49	1,625.94	28.88	55.45	697.04
Loss from Fires per Bale Ginned											
Machinery Loss	0.0204	--	0.0111	2.2348	0.0054	0.0004	0.7402	1.3055	0.0054	0.0003	0.5181
Building Loss	--	--	--	0.1423	--	--	0.0471	0.0826	--	--	0.0327
Cotton Loss	0.0272	0.0346	0.0306	0.1043	0.0193	0.0267	0.0511	0.0720	0.0193	0.0290	0.0449
Gin Time Loss	0.0041	0.0071	0.0055	0.0109	0.0086	0.0035	0.0068	0.0080	0.0086	0.0045	0.0064
Extinguisher Material Used	0.0072	0.0077	0.0074	0.0060	0.0070	0.0052	0.0058	0.0065	0.0070	0.0059	0.0063
Total Loss from Fires	0.0589	0.0494	0.0546	2.4983	0.0403	0.0358	0.8510	1.4746	0.0403	0.0397	0.6084

SUMMARY OF GINNING AND FIRE EXPERIENCE CLASSIFIED BY TYPES OF EQUIPMENT AND FIRE PREVENTIVE DEVICES, SAMPLE GINS; OKLAHOMA 1957

| | Moderate Equipment | | | Elaborate Equipment | | | | All Equipment | | | |
	Green Boll Traps	No Device	Total	Green Boll Traps	Green Boll Traps and Magnets	No Device	Total	Green Boll Traps	Green Boll Traps and Magnets	No Device	Total
Number of Gins	11	11	22	13	4	12	29	24	4	23	51
Volume of Ginning											
Total Bales Ginned	14,616	6,308	20,924	25,388	10,874	23,966	60,228	40,004	10,874	30,274	81,152
Number of Bales per Gin	1,329	573	951	1,953	2,718	1,997	2,077	1,667	2,718	1,316	1,591
Fire Experience											
Total Number of Fires	18	10	28	20	16	20	56	38	16	30	84
Bales Ginned per Fire	812	631	747	1,269	680	1,198	1,075	1,053	680	1,009	966
Number of Fires per Gin	1.64	.91	1.27	1.54	4.00	1.67	1.93	1.58	4.00	1.30	1.65
Number of Gins Having Fires	9	4	13	10	4	10	24	19	4	14	37
Loss from Fires by all Gins						Dollars					
Machinery Loss	--	40,000.00	40,000.00	45,150.00	--	--	45,150.00	45,150.00	--	40,000.00	85,150.00
Building Loss	--	10,000.00	10,000.00	10,000.00	--	--	10,000.00	10,000.00	--	10,000.00	20,000.00
Cotton Loss	636.53	6,750.00	7,386.53	2,407.50	358.00	705.80	3,471.30	3,044.03	358.00	7,455.80	10,857.83
Gin Time Loss	102.60	107.80	210.40	419.88	198.02	104.63	722.53	522.48	198.02	212.43	932.93
Extinguisher Material Used	383.10	124.40	507.50	286.45	14.00	78.75	379.20	669.55	14.00	203.15	886.70
Total Loss from Fires	1,122.23	56,982.20	58,104.43	58,263.83	570.02	889.18	59,723.03	59,386.06	570.02	57,871.38	117,827.46
Loss from Fires per Gin											
Machinery Loss	--	3,636.36	1,818.18	3,473.08	--	--	1,556.90	1,881.25	--	1,739.13	1,669.61
Building Loss	--	909.09	454.55	769.23	--	--	344.83	416.67	--	434.78	392.16
Cotton Loss	57.87	613.64	335.75	185.19	89.50	58.82	119.70	126.83	89.50	324.17	212.90
Gin Time Loss	9.33	9.80	9.56	32.30	49.50	8.72	24.91	21.77	49.50	9.24	18.29
Extinguisher Material Used	34.82	11.31	23.07	22.03	3.50	6.56	13.08	27.90	3.50	8.83	17.39
Total Loss from Fires	102.02	5,180.20	2,641.11	4,481.83	142.50	74.10	2,059.42	2,474.42	142.50	2,516.15	2,310.35
Loss from Fires per Fire											
Machinery Loss	--	4,000.00	1,428.57	2,257.50	--	--	806.25	1,188.16	--	1,333.33	1,013.69
Building Loss	--	1,000.00	357.14	500.00	--	--	178.57	263.16	--	333.33	238.09
Cotton Loss	35.36	675.00	263.80	120.38	22.38	35.29	61.99	80.10	22.38	248.53	129.26
Gin Time Loss	5.70	10.78	7.51	20.99	12.38	5.23	12.90	13.75	12.38	7.08	11.11
Extinguisher Material Used	21.28	12.44	18.13	14.32	0.87	3.94	6.77	17.62	0.87	6.77	10.56
Total Loss from Fires	62.34	5,698.22	2,075.15	2,913.19	35.63	44.46	1,066.48	1,562.79	35.63	1,929.05	1,402.71
Loss from Fires per Bale Ginned											
Machinery Loss	--	6.3412	1.9117	1.7784	--	--	0.7497	1.1286	--	1.3213	1.0493
Building Loss	--	1.5853	0.4779	0.3939	--	--	0.1660	0.2500	--	0.3303	0.2464
Cotton Loss	0.0436	1.0701	0.3530	0.0948	0.0329	0.0294	0.0576	0.0761	0.0329	0.2463	0.1338
Gin Time Loss	0.0070	0.0171	0.0101	0.0165	0.0182	0.0044	0.0120	0.0131	0.0182	0.0070	0.0115
Extinguisher Material Used	0.0262	0.0197	0.0242	0.0113	0.0013	0.0033	0.0063	0.0167	0.0013	0.0067	0.0109
Total Loss from Fires	0.0768	9.0334	2.7769	2.2949	0.0524	0.0371	0.9916	1.4845	0.0524	1.9116	1.4519

APPENDIX B - TABLE III

SUMMARY OF GINNING AND FIRE EXPERIENCE CLASSIFIED BY TYPES OF EQUIPMENT AND FIRE PREVENTIVE DEVICES, SAMPLE GINS; OKLAHOMA 1958

	Moderate Equipment			Elaborate Equipment				All Equipment			
	Green Boll Traps	No Device	Total	Green Boll Traps	Green Boll Traps and Magnets	No Device	Total	Green Boll Traps	Green Boll Traps and Magnets	No Device	Total
Number of Gins	9	5	14	13	4	13	30	22	4	18	44
Volume of Ginning											
Total Bales Ginned	18,058	2,749	20,807	29,488	14,776	30,918	75,182	47,546	47,776	33,667	95,989
Number of Bales per Gin	2,006	550	1,486	2,268	3,694	2,378	2,506	2,161	3,694	1,870	2,182
Fire Experience											
Total Number of Fires	11	7	18	16	5	20	41	27	5	27	59
Bales Ginned per Fire	1,642	393	1,156	1,843	2,955	1,546	1,834	1,761	2,955	1,247	1,627
Number of Fires per Gin	1.22	1.40	1.29	1.23	1.25	1.54	1.37	1.23	1.25	1.50	1.34
Number of Gins Having Fires	4	2	6	7	3	7	17	11	3	9	23
Loss from Fires by all Gins						----Dollars----					
Machinery Loss	--	--	--	10.00	--	--	10.00	10.00	--	--	10.00
Building Loss	--	--	--	--	--	--	--	--	--	--	--
Cotton Loss	375.00	117.00	492.00	1,048.75	163.50	765.17	1,977.42	1,423.75	163.50	882.17	2,469.42
Gin Time Loss	60.35	4.00	64.35	96.05	69.60	140.70	306.35	156.40	69.60	144.70	370.70
Extinguisher Material Used	70.00	--	70.00	232.00	23.50	53.30	308.80	302.00	23.50	53.30	378.80
Total Loss from Fires	505.35	121.00	626.35	1,386.80	256.60	959.17	2,602.57	1,892.15	256.60	1,080.17	3,228.92
Loss from Fires per Gin											
Machinery Loss	--	--	--	0.77	--	--	0.33	0.45	--	--	0.23
Building Loss	--	--	--	--	--	--	--	--	--	--	--
Cotton Loss	41.66	23.40	35.14	80.67	40.88	58.86	65.92	64.72	40.88	49.01	56.12
Gin Time Loss	6.71	0.80	4.60	7.39	17.40	10.82	10.21	7.11	17.40	8.04	8.42
Extinguisher Material Used	7.78	--	5.00	17.85	5.87	4.10	10.29	13.73	5.87	2.96	8.61
Total Loss from Fires	56.15	24.20	44.74	106.68	64.15	73.78	86.75	86.01	64.15	60.01	73.38
Loss from Fires per Fire											
Machinery Loss	--	--	--	0.62	--	--	0.24	0.37	--	--	0.17
Building Loss	--	--	--	--	--	--	--	--	--	--	--
Cotton Loss	34.09	16.71	27.33	65.55	32.70	38.26	48.23	52.73	32.70	32.67	41.85
Gin Time Loss	5.49	0.57	3.58	6.00	13.92	7.04	7.47	5.79	13.92	5.36	6.29
Extinguisher Material Used	6.36	--	3.89	14.50	4.70	2.66	7.53	11.19	4.70	1.97	6.42
Total Loss from Fires	45.94	17.28	34.80	86.67	51.32	47.96	63.47	70.08	51.32	40.00	54.73
Loss from Fires per Bale Ginned											
Machinery Loss	--	--	--	0.0003	--	--	0.0001	0.0002	--	--	0.0001
Building Loss	--	--	--	--	--	--	--	--	--	--	--
Cotton Loss	0.0208	0.0426	0.0236	0.0356	0.0110	0.0247	0.0263	0.0299	0.0110	0.0262	0.0257
Gin Time Loss	0.0033	0.0014	0.0031	0.0032	0.0047	0.0046	0.0041	0.0033	0.0047	0.0043	0.0039
Extinguisher Material Used	0.0039	--	0.0034	0.0079	0.0016	0.0017	0.0041	0.0064	0.0016	0.0016	0.0039
Total Loss from Fires	0.0280	0.0440	0.0301	0.0470	0.0173	0.0310	0.0346	0.0398	0.0173	0.0321	0.0336

SUMMARY OF GINNING AND FIRE EXPERIENCE CLASSIFIED BY TYPES OF EQUIPMENT AND FIRE PREVENTIVE DEVICES, SAMPLE GINS; OKLAHOMA 1956-1958

	Moderate Equipment			Elaborate Equipment				All Equipment			
	Green Boll Traps	No Device	Total	Green Boll Traps	Green Boll Traps and Magnets	No Device	Total	Green Boll Traps	Green Boll Traps and Magnets	No Device	Total
Number of Gins	31	31	62	40	12	40	92	71	12	71	154
Volume of Ginning											
Total Bales Ginned	45,631	19,829	65,460	72,793	34,961	81,831	189,585	118,424	34,961	101,660	255,045
Number of Bales per Gin	1,472	640	1,056	1,820	2,913	2,046	2,061	1,668	2,913	1,432	1,656
Fire Experience											
Total Number of Fires	42	27	69	51	34	57	142	93	34	84	211
Bales Ginned per Fire	1,086	734	946	1,427	1,028	1,436	1,335	1,273	1,028	1,210	1,209
Number of Fires per Gin	1.35	.87	1.11	1.28	2.83	1.43	1.54	1.31	2.83	1.18	1.37
Number of Gins Having Fires	21	12	33	26	11	24	61	47	11	36	94
Loss from Fires by all Gins						----Dollars----					
Machinery Loss	264.00	40,000.00	40,264.00	85,200.00	50.00	10.00	85,260.00	85,464.00	50.00	40,010.00	125,524.00
Building Loss	--	10,000.00	10,000.00	12,550.00	--	--	12,550.00	12,550.00	--	10,000.00	22,555.00
Cotton Loss	1,364.53	7,240.00	8,604.53	5,325.25	701.50	2,190.97	8,217.72	6,689.78	701.50	9,430.97	16,822.25
Gin Time Loss	216.65	188.30	404.95	710.80	347.98	338.71	1,397.49	927.45	347.98	527.01	1,802.44
Extinguisher Material Used	546.77	207.49	754.26	626.53	102.50	273.31	1,002.34	1,173.30	102.50	480.80	1,756.60
Total Loss from Fires	2,391.95	57,635.79	60,027.74	104,412.58	1,201.98	2,812.99	108,427.55	106,804.53	1,201.98	60,448.78	168,455.29
Loss from Fires per Gin											
Machinery Loss	8.52	1,290.32	649.42	2,130.00	4.17	0.25	926.78	1,203.76	4.17	563.54	815.09
Building Loss	--	322.58	161.29	313.75	--	--	136.42	176.77	--	140.85	146.43
Cotton Loss	44.02	233.55	138.78	133.13	58.46	54.77	89.33	94.23	58.46	132.84	109.24
Gin Time Loss	6.99	6.07	6.53	17.77	29.00	8.47	15.19	13.06	29.00	7.42	11.70
Extinguisher Material Used	17.64	6.69	12.17	15.66	8.54	6.83	10.89	16.52	8.54	6.77	11.41
Total Loss from Fires	77.17	1,859.21	968.19	2,610.31	100.17	70.32	1,178.61	1,504.34	100.17	851.42	1,093.87
Loss from Fires per Fire											
Machinery Loss	6.28	1,481.48	583.55	1,670.60	1.47	0.18	600.40	918.99	1.47	476.32	594.86
Building Loss	--	370.37	144.93	246.08	--	--	88.38	134.95	--	119.05	106.86
Cotton Loss	32.49	268.15	124.70	104.42	20.63	38.44	57.87	71.94	20.63	112.28	79.72
Gin Time Loss	5.16	6.97	5.87	13.94	10.24	5.94	9.84	9.97	10.24	6.27	8.54
Extinguisher Material Used	13.02	7.68	10.93	12.28	3.01	4.79	7.06	12.62	3.01	5.72	8.33
Total Loss from Fires	56.95	2,134.65	869.98	2,047.32	35.35	49.35	763.55	1,148.47	35.35	719.64	798.31
Loss from Fires per Bale Ginned											
Machinery Loss	0.0058	2.0172	0.6151	1.1704	0.0014	0.0001	0.4497	0.7217	0.0014	0.3935	0.4922
Building Loss	--	0.5043	0.1528	0.1724	--	--	0.0662	0.1060	--	0.0984	0.0884
Cotton Loss	0.0299	0.3651	0.1314	0.0732	0.0201	0.0268	0.0433	0.0565	0.0201	0.0928	0.0659
Gin Time Loss	0.0047	0.0095	0.0062	0.0098	0.0100	0.0042	0.0074	0.0078	0.0100	0.0052	0.0071
Extinguisher Material Used	0.0120	0.0105	0.0115	0.0086	0.0029	0.0033	0.0053	0.0099	0.0029	0.0047	0.0069
Total Loss from Fires	0.0524	2.9066	0.9170	1.4344	0.0344	0.0344	0.5719	0.9019	0.0344	0.5946	0.6605

APPENDIX C

Schedule for Rating

GIN HOUSE BASIS RATES[1]

A. Brick, stone, concrete, hollow tile or steel iron clad gin
    house with metal or incombustible roof on steel supports $2.55
B. Brick, stone, concrete, hollow tile or steel iron clad gin
    house with metal or incombustible roof on wood rafters or
    supports   2.80
C. Frame or frame iron clad ginhouse with metal or other
    incombustible roof   3.45
    1. Floors: If combustible floor in part of building,
                 (except press platform), add   .30
    2. Height: For each story over one, add   .30
    3. Roof: Wood shingle, board, or unapproved composition,
                 add   1.00
    4. Boiler:
        (a) In boiler house of brick, stone, concrete, hollow
             tile or all steel construction with no wood work
             within 5 feet of gin house, unless property cut
             off by standard fire wall, add   .30
        (b) In boiler house with brick, stone, hollow concrete
             block or tile walls with wood rafters or supports,
             within 5 feet of gin house, unless property cut off
             by standard fire wall, add   .50
        (c) If walls are frame or frame iron clad:
             1. Within 20 feet of ginhouse or sheds or awnings
                 attached to either building, add   .65
             2. Within 40 feet of (and more than 20 feet from)
                 ginhouse or sheds or awnings attached to
                 either building, add   .30
                 NOTE: If other than steam power make no charge
                        under Item 4, but apply Item 10(d).

    5. Smoke Stacks:
        (a) If not equipped with spark arrester of not more than
             1/2 inch mes, add   .10
        (b) If less than 18 inch clearance from all wood work, add   .25
        (c) If less than 40 feet high, add   .25
    6. Electric Motors: If in main building or not cut off in
                          accordance with standards, add   .25
                          NOTE: Not to apply if motor is
                                 approved enclosed dustless
                                 type. Switchboards and/or
                                 Fuses: Must be installed in
                                 accordance with standards.
    7. Electrical Grounding: If gin machinery not grounded
                          according to standard, add   .20

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[1]Cotton Risks containing General Basis Schedules, Nos. 38-6-37,
Oklahoma Inspection Bureau, Oklahoma City, Oklahoma.

8. Internal Combustion Engine:
    (a) If not located in separate room cut off by partition, with self-closing door, add $ .25
    (b) If with gravity feed, add   .25
        NOTE: If Diesel engine, refer to Oklahoma Inspection Bureau.
    (c) Unless supply tank located outside of building, 5 feet distant and buried 3 feet underground, or 20 feet distant if above ground, add   .25

9. Cotton Cleaner: No approved seed cotton cleaner or cleaning system not properly installed, add   .30

10. Flues and Condensers:
    (a) If no lint flues and battery condenser, add   1.90
    (b) If lint flues are not all metal, add   .35
    (c) If dust flues are not all metal, add   .35
    (d) If no steam pipe from boiler to lint flues and condenser, add   .50
        NOTE: Must have only one valve, accessibly located.

11. Press: If single box press (not applying to round bale press), add   .30
        NOTE: Omit if charge 10(a) is made.

11 1/2. Cotton Drying and/or Conditioning:
    1. Furnace, burner or boiler:
        (a) If gas, oil or electric fuel--
            1. In building, addition or engine room not properly cut off   .10
                NOTE: Not cumulative with charge under Items 4, 6, and 8(a).
        (b) If fuel other than gas, oil or electric--
            1. In building, addition or engine room of incombustible construction, properly cut off, or in separate building of incombustible construction within ten feet   .10
            2. In building, addition or engine room of incombustible construction, not cut off   .15
            3. In building, addition or engine room of combustible construction, properly cut off, or in separate building of combustible construction within 25 feet   .25
            4. In building, addition or engine room of combustible construction, not cut off   .35
                NOTE: Charge under Item 11 1/2., 1. (b) is not cumulative with charge under Item 4. When both charges apply, make highest charge only.
    2. Cabinet:
        (a) If any part of dryer cabinet is of combustible material and located in gin or within five feet of gin building   .50
        (b) If installation of cotton dryer creates congested condition in gin or if dryer is not readily accessible and arranged so it is not under close observation at all times, or if otherwise not properly installed (see standards)   .10 to .50

12. Barrels and Buckets: If none, or not according to standard, add $1.25

13. Chemical Extinguishers: If none, or not according to standard, add .30

14. Elevated Tank and Hose: If none, or not according to standard, add .30

15. Storage or Use: If hay, feed or broom corn stored in buildings on gin premises, add .95

16. Seed Cotton or Cotton Seed stored in gin house, add .75

17. Corn Shucker or Feed Mill: If operated in connection with gin, add 1.50

18. Corn Sheller or Flour Mill: If operated in connection with gin, add .35
    NOTE: Not cumulative with Item 17.

19. Accumulation of Hulls: If hulls, burrs, shale or other trash be discharged within 25 feet of gin house, add .30
    NOTE: This charge not to apply where burned according to standard in boiler or in standard incinerator properly located.
    Incinerator to be of 12 inch brick walls not less than 18 feet high and not less than 12 feet inside diameter top and bottom, with top 2 feet of walls honeycombed to permit air passage, with trash discharge 8 feet above ground, and located at least 40 feet from any building or gin plant. For full standards of construction, refer to Oklahoma Inspection Bureau.

CREDITS

20. Municipal Protection: If gin located within city limits of 8th class town or better and is within 250 feet of a public fire hydrant, deduct .20

21. All Metal Machinery:
    (a) For machinery entirely incombustible, (except press) in building of incombustible construction (no woodwork except press platform), deduct .25
    (b) For machinery entirely incombustible, with steel press (excepting press boards) in building of incombustible construction (no woodwork) and with incombustible press platform, deduct .50

22. Watchman:
    (a) If watchman service according to standard during operating season only, deduct .25
    (b) If watchman service according to standard during entire year, deduct .50

23. Whitewash: If all interior woodwork of gin house is whitewashed or painted with approved fireproof paint throughout, at least once each year, deduct .10

24. Cotton House: If equipped with at least 1 inch steam jets, deduct .20

25. Carbon Dioxide Systems: For approved carbon dioxide ex-
tinguishing system in lint flues and condenser in lieu
of steam jets, deduct $ .50

26. Exposures:
   (a) Cotton house within 40 feet and unless a clear space
      of at least 25 feet is maintained between open sheds,
      awnings, or driveways attached to either building,
      add   .65

         NOTE: If walls of both cotton house and gin
               house are brick, stone, concrete, hollow
               concrete block, tile or skeleton steel
               (no combustible material in walls), reduce
               charge one-half.

   (b) Baled cotton or seed cotton on platform or in yard
      within 40 feet of gin if left over night, add   .95

   (c) Saw mill in connection with gin, and located adjoining
      or within 100 feet, add   2.50

   (d) Add for exposure from other property as per exposure
      tables in General Basis Schedule No. 3.

27. <u>Aftercharges</u>: Faults of management, general condition of
premises or hazard not provided for in schedule, add   .05 - 1.00

28. <u>Buildings and Contents</u>: Cotton Houses, Seed Cotton or
Cotton Seed Houses, Boiler Houses, Offices and all other
Auxiliary Buildings, and Machinery, Furniture and Fixtures
in same take same rate as Gin House. For Cotton (Baled
and Unbaled), See Cotton, Cotton Seed, Bagging and Ties,
see Items No. 30-33 inclusive.

29. <u>Other Occupancies</u>: Occupancies other than above in
connection with gin, refer to Oklahoma Inspection Bureau
for rating.

THREE-FOURTHS VALUE CLAUSE

The Three-Fourth Value Clause must be attached to all policies
covering buildings and/or contents (except cotton, seed cotton, cotton
seed, bagging and ties) without regard to fire protection.

GIN PRODUCTS IN OR WITHIN 100 FEET OF GIN
OR AUXILIARY BUILDINGS
Coverage

                                                  Rate

30. Blanket on cotton (baled and unbaled), seed cotton,
cotton seed, bagging and ties (no exclusions)   Gin Rate
    Minimum Rate, $3.75.

31. Same as Item 30 but excluding baled cotton   Gin Rate plus .65
    Minimum Rate, $3.75.

32. Baled cotton, cotton seed and/or bagging and ties   Gin Rate
    Minimum Rate, $3.75

33. Unbaled Cotton   Gin Rate plus 1.25
    Minimum Rate, $3.75.

34. <u>Coinsurance Clause</u>: All policies covering Gin products must contain Cotton Coinsurance Clause.

35. <u>Minimum Term and Cancellation</u>: No policy on Gin products (except specific insurance on baled cotton) shall be written for a period of less than one month. If cancelled by insured the company shall retain at least one month's premium. Specific insurance on baled cotton may be written for less than one month at option of company. Oklahoma Standard Short Rate Table to be used.

VITA

Percy Leo Strickland, Jr.

Candidate for the Degree of

Master of Science

Thesis: AN ANALYSIS OF THE FIRE EXPERIENCE AND INSURANCE COST FOR
OKLAHOMA COTTON GINS, 1956-1958

Major Field: Agricultural Economics

Biographical:

Personal Data: Born in Sampson County, North Carolina, May 16,
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