

The Report of the  
GAIN/LOSS ANALYSIS OF FINANCIAL EXPERIENCE  
During calendar 1982  
Mankato Fire Department  
Relief Association  
Mankato, Minnesota

## TABLE OF CONTENTS

<u>Pages</u>	<u>Item</u>
1	Signature Page
2	Purpose of Gain/Loss Analysis
3	Activity Which Results in Gains or Losses
4	Composite Results of Gain/Loss Analysis 1982
5	1979 thru 1981
6	Schedule of Active Employees
7	Comparative Schedule of Active Members
8	Schedule of Separations From Active Service (Withdrawal)
9	Schedule of Separations From Active Service (Death & Disability)
10	Schedule of Age & Service Retirement
11	Schedule of Death After Retirement
12	Comments

### Appendices

Valuation Methods and Assumptions

Summary of Benefit Provisions

GABRIEL, ROEDER, SMITH & COMPANY  
ACTUARIES & CONSULTANTS

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February 21, 1983

Board of Trustees

Mankato Fire Department Relief Association

Mankato, Minnesota

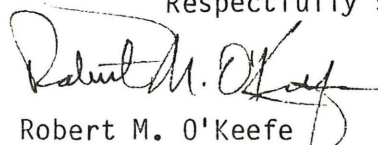
Submitted in this report are the results of the 1982 gain/loss analysis of the financial experiences of the Mankato Fire Department Relief Association.

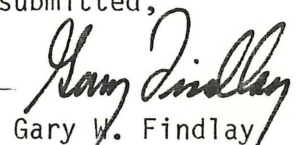
The composite results of this study are reported on Schedule 1, and comments regarding the results are on page 12.

The gain/loss analysis was based upon statistical data furnished by the Association regarding active and retired member changes and related financial transactions.

The actuarial assumptions used for regular valuation purposes and which produce "expected" experience data are shown in the appendix of this report. A brief summary of the Association's benefits is also included in the appendix.

Respectfully submitted,

  
Robert M. O'Keefe

  
Gary W. Findlay

## PURPOSE OF GAIN/LOSS ANALYSIS

Actual financial experience will not coincide exactly with assumed financial experience--differences are to be expected since the future cannot be predicted with absolute precision. The changes in computed liabilities resulting from differences between actual and assumed experiences are called actuarial gains, if the experience was financially favorable and actuarial losses, if the experience was financially unfavorable. Actuarial gains result in decreases in contribution rates and actuarial losses result in increases.

Regular actuarial valuations provide information about aggregate computed liabilities. However, regular valuations do not develop the information needed to explain the year to year changes in computed liabilities attributable to each activity within the retirement system financial mechanism. The purpose of a gain/loss analysis is to determine the change in computed liabilities and contribution rates attributable to variations between actual and assumed experience.

Once a difference between actual and assumed experience in a risk area has been observed to be sizeable and persistent, the assumed experience should be changed to reflect the observed reality. However, gains and losses over a relatively short period of time may not be indicative of long term trends which provide the basis for selection of actuarial assumptions.

## ACTIVITY WHICH RESULTS IN GAINS OR LOSSES

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### Age & Service Retirement.

If members retire at older ages than assumed, there is a gain. If retirements occur at younger ages than assumed there is a loss.

### Disability & Death-in-Service.

If casualty claims are less than assumed, there is a gain. If there are more casualty losses than assumed, there is a loss.

### Withdrawal.

If more liabilities are released by withdrawal than assumed, there is a gain.  
If there are fewer withdrawals than assumed, there is a loss.

### Salary Increases.

If there are smaller salary increases than assumed, there is a gain.  
If salary increases are greater than assumed, there is a loss.

### Investment Income.

If there is greater investment income than assumed, there is a gain.  
If investment income is less than assumed, there is a loss.

### Post Retirement Mortality.

If benefit recipients die at younger ages than assumed, there is a gain.  
If they live longer than assumed, there is a loss.

### Contribution.

Gains or losses arise due to the delay in implementing changes in the recommended contribution.

### Miscellaneous.

Miscellaneous gains and losses include changes due to data adjustments, rounding and changes in the average age and service characteristics of the group.



Mankato Fire Department Relief Association

Schedule 1.

Gains & Losses in Accrued Liabilities  
and Changes in Contribution Requirements  
During Calendar 1982

<u>Type of Activity</u>	<u>Accrued Liabilities</u> <u>(Gain) or Loss *</u>		<u>Contribution Requirements</u> <u>(Gain) or Loss *</u>	
	<u>Active</u>	<u>Retirants &amp;</u>	<u>Normal Cost</u>	<u>\$ Payment</u>
	<u>Members</u>	<u>Beneficiaries</u>	<u>% of Payroll</u>	<u>on UAL</u>
	(\$ in 1,000)			(\$ in 1,000)
<u>Age &amp; Service Retirements</u>	\$167.5	\$ N/A	(0.03)%	\$11.16
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	(11.3)	N/A	(0.02)	(0.75)
b. <u>Death-in Service</u>	(11.3)	N/A	(0.01)	(0.75)
<u>Withdrawal</u>	1.6	N/A	0.00	0.11
<u>Salary Increases</u>	(0.6)	(1.3)	N/A	(0.13)
<u>Investment Income</u>	(28.3)	(50.0)	N/A	(5.22)
<u>Post Retirement Mortality</u>	N/A	81.7	N/A	5.44
<u>Contribution</u>	1.9	67.9	(0.05)	4.65
<u>Miscellaneous</u>	<u>7.1</u>	<u>5.8</u>	<u>N/A</u>	<u>0.86</u>
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$126.6	\$104.1	(0.11)%	\$15.37
<u>Changes due to plan amendments</u>	<u>0.0</u>	<u>0.0</u>	<u>0.00</u>	<u>0.00</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$126.6</u>	<u>\$104.1</u>	<u>(0.11)%</u>	<u>\$15.37</u>

\* Accrued liabilities and contribution requirements are affected by gains and losses.  
Gains result in reductions in both and losses result in increases in both.

## Mankato Fire Department Relief Association

Schedule 2.

Gains & Losses in Accrued Liabilities  
From January 1, 1979 thru December 31, 1981

Type of Activity	1/1/79 - 12/31/79		1/1/80 - 12/31/80		1/1/81 - 12/31/81	
	Accrued Liabilities		Accrued Liabilities		Accrued Liabilities	
	(Gain) or Loss		(Gain) or Loss		(Gain) or Loss	
	Active Members	Retirants & Beneficiaries	Active Members	Retirants & Beneficiaries	Active Members	Retirants & Beneficiaries
	(\$ in 1,000)		(\$ in 1,000)		(\$ in 1,000)	
<u>Age &amp; Service Retirements</u>	\$236.13	\$ N/A	\$ (7.02)	\$ N/A	\$631.2	\$ N/A
<u>Disability &amp; Death-in-Service</u>						
a. <u>Disability</u>	(10.24)	N/A	(9.86)	N/A	(13.3)	N/A
b. <u>Death-in Service</u>	(25.51)	N/A	(25.54)	N/A	(12.6)	N/A
<u>Withdrawal</u>	2.57	N/A	2.87	N/A	1.1	N/A
<u>Salary Increases</u>	57.81	107.47	112.26	125.19	183.0	351.7
<u>Investment Income</u>	(2.29)	(1.21)	(3.99)	(4.25)	(23.0)	(25.4)
<u>Post Retirement Mortality</u>	N/A	6.07	N/A	49.71	N/A	18.8
<u>Contribution</u>	17.92	32.62	8.25	18.08	6.8	41.8
<u>Miscellaneous</u>	7.24	3.80	(0.03)	(0.06)	7.1	3.6
EXPERIENCE RELATED (GAIN)/LOSS	\$283.63	\$148.75	\$ 76.94	\$188.67	\$780.3	\$390.5
Method Change for Casualty Cost			148.17			
<u>Changes Due to Plan Amendments</u>	N/A	N/A	N/A	N/A	0.0	0.0
TOTAL (GAIN)/LOSS DURING PREVIOUS 3 YEAR PERIOD	<u>\$283.63</u>	<u>\$148.75</u>	<u>\$225.11</u>	<u>\$188.67</u>	<u>\$780.3</u>	<u>\$390.5</u>

Mankato Fire Department Relief Association

Schedule 3.

Employees Active at Both Beginning & End of 1982

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<u>Age Group Beg. Year</u>	<u>No.</u>	<u>Beginning Salary</u>	<u>Ending Salary</u>	<u>% Increase In Salary</u>
35-39	4	\$ 84,432	\$ 87,360	3.5%
40-44	4	84,432	87,360	3.5
45-49	9	189,972	196,560	3.5
50-54	2	42,216	43,680	3.5
65-69	<u>1</u>	<u>21,108</u>	<u>21,840</u>	3.5
TOTALS	20	\$422,160	\$436,800	3.5%

Employees Active at Either Beginning or End of 1982

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<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5 or more	22	20

Average Age: 46.3 years.

Average Service: 20.4 years.



Mankato Fire Department Relief Association

Schedule 4.

Comparative Schedule

Of Active Members

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Valuation Date December 31	Active Members	Valuation Payroll	Average			
			Age	Service	Pay	% Incr.
1978	30	\$471,960	45.0 yrs.	18.3 yrs.	\$15,732	- %
1979	27	454,572	45.1	18.6	16,836	7.0
1980	27	497,664	46.1	19.6	18,432	9.5
1981	22	464,376	46.1	20.2	21,108	14.5
1982	20	436,800	46.3	20.4	21,840	3.5

Mankato Fire Department Relief Association

Schedule 5.

Separations From Active Service Due to Withdrawal

During Four Year Period Ended December 31, 1982

Age at Termination	1979		1980		1981		1982	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
30-34		*		*				
35-39		0.1		0.1		0.1		*
40-44		*		*		*		*
45-49		*		*		*		*
50-54		*				*		*
55-59		*						
60-64		*				*		
Totals	0	0.1	0	0.1	0	0.1	0	0.1

Total actual during four year period 0  
Total expected during four year period 0.4

Years Service at Termination	1979		1980		1981		1982	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
0								
1								
2								
3								
4								
5 or more		0.2		0.1		0.1		0.1
Totals	0	0.2	0	0.1	0	0.1	0	0.1

\* Less than 0.1%

Mankato Fire Department Relief Association

Schedule 6.

Separations From Active Service Due to Death and Disability

During Four Year Period Ended December 31, 1982

Death Separations

Age at Time of Death	1979		1980		1981		1982	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
30-34		*		*				
35-39		*		*		*		*
40-44		0.1		0.1		*		*
45-49		0.1		0.1		0.1		0.1
50-54		*		*		*		*
55-59		*		*				
60-69		*				*		
Totals	0	0.2	0	0.2	0	0.2	0	0.2

Total actual during four year period 0  
Total expected during four year period 0.8

Disability Separations

Age at Time of Disability	1979		1980		1981		1982	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
30-34		*		*				
35-39		*		*		*		*
40-44		0.1		*		*		*
45-49		*		0.1		*		*
50-54		*		*		*		*
55-59		*		*				
60-64		*				*		
Totals	0	0.1	0	0.1	0	0.1	0	0.1

Total actual during four year period 0  
Total expected during four year period 0.4

Mankato Fire Department Relief Association

Schedule 7.

Separations From Active Service  
For Age & Service Retirement

Age at Termination	1979		1980		1981		1982	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
50					1		1	
51	2				3			
52					1			
61	1						1	
64		1.0						
65 & Over	—	—	—	<u>1.0</u>	—	<u>1.0</u>	—	<u>1.0</u>
TOTALS	3	1.0	0	1.0	5	1.0	2	1.0

Average age at retirement during period examined was 53.8 years.

Average service at retirement during period examined was 25.0 years.

Mankato Fire Department Relief Association

Schedule 8.

Death After Retirement  
(Disability and Service Retirants)

Age at Death	1979		1980		1981		1983	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
50-54		0.0201		0.0222		0.0746		0.0909
60-64		0.0540		0.0258		0.0280		0.0540
65-69	1	0.3066		0.3154		0.2920		0.1255
70-74		0.3905		0.3317		0.3363		0.4144
75-79				0.1361		0.2151		0.3687
85-89	—	<u>0.1545</u>	—	<u>0.1667</u>	—	<u>0.1798</u>	—	<u>0.1943</u>
TOTALS	1	0.9257	0	0.9979	0	1.1258	0	1.2478

Total actual during four year period 1

Total expected during four year period 4.2972



## COMMENTS

### Economic Assumptions and Financing Method

The economic assumptions of 5% annual investment return and 3 1/2% annual salary increases are established by state law. State law also specifies that the annual minimum obligation of the municipality shall be determined by adding (i) the employer normal cost percent times covered payroll to (ii) the level dollar amount required to amortize the unfunded accrued liability by December 31, 2010.

Over the past few years, both the actual rates of salary increase and investment return have generally exceeded the assumed rates, resulting in increases in the dollar amount of unfunded accrued liabilities. If the financial experiences of recent years persist, and the economic assumptions and financing method are not changed, it is reasonable to expect that unfunded accrued liabilities will increase in actual dollar amount for a number of years. This is true even though a level dollar amortization schedule is being followed. Accordingly, it is reasonable to expect that under the described conditions the actual dollar contributions required to make amortization payments will increase for a number of years. On the other hand, if inflation subsides and actual economic activity approaches assumed experience, it is reasonable to expect the dollar amount of the contribution to amortize the unfunded accrued liability to remain relatively constant. The notion that amortization dollar amounts may be increasing is not necessarily cause for alarm. If adjusted for changes in purchasing power, any future increases in the dollar contributions may or may not reflect increases in terms of real dollars (inflation adjusted dollars).

It is also worth noting that when the same assumptions and methods are applied to plans which differ in nature, the valuation results may not be comparable (for example, it is currently not valid to compare valuation results for a plan having full escalation to valuation results for a plan having a 3 1/2% cap on escalation.) Caution should be exercised when attempting to assess the financial condition of one Association relative to another on the basis of valuation results produced using the assumptions and methods mandated by state law.

## APPENDICES

Pay Adjustment Factor used to Project Current Pays

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<u>Sample Ages</u>	<u>Present Pay Resulting in Pay of \$1,000 at Age 60</u>	<u>Percent Increase in Pay During Next Year</u>
20	\$ 253	3.5%
25	300	3.5
30	356	3.5
35	423	3.5
40	503	3.5
45	597	3.5
50	709	3.5
55	842	3.5
60	1,000	3.5

Use of the pay adjustment factor illustrated above is required by state law.

Disability retirements were assumed to occur as indicated below:

<u>Sample Ages</u>	<u>% of Active Members Becoming Disabled Within Next Year</u>
20	0.08%
25	0.08
30	0.08
35	0.08
40	0.20
45	0.26
50	0.49
55	0.89

# Mankato Fire Department Relief Association

## Valuation Methods and Assumptions

The Entry Age Normal Cost method was used to determine the normal cost of all benefits.

The rate of investment return (interest) used in making the valuation was 5.0 percent per annum, compounded annually. State law requires use of this assumption.

The mortality table used was the United States Life Table, 1959-61, White Males and White Females.

Sample Ages	Single Life Values: Present Value of \$1 Monthly				Future Life Expectancy (Years)	
	Level		Increasing			
	For Life		3.5% Yearly		Men	Women
	Men	Women	Men	Women		
45	\$169.61	\$186.84	\$263.23	\$304.86	27.33	32.52
50	154.85	174.20	229.51	270.80	23.22	28.08
55	139.29	159.62	197.24	236.11	19.45	23.81
60	122.79	142.73	166.26	200.76	16.01	19.69
65	106.31	124.22	137.82	166.16	12.97	15.88
70	89.86	104.31	111.71	132.82	10.29	12.38
75	73.39	83.92	87.66	101.94	7.92	9.28
80	57.54	64.24	66.29	74.77	5.89	6.67

Age & service retirement was assumed to occur at age 62, or attained age if older.

Sample Rates of Separation From Active Employment Before Retirement, Death or Disability

Sample Ages	% of Active Members Separating Within Next Year
20	3.00%
25	2.50
30	2.00
35	1.50
40	1.00
45	0.50
50+	0.00



Mankato Fire Department Relief Association

Brief Summary (12/31/82) of Benefit Provisions Evaluated and/or Considered

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Age & Service Retirement.

Eligibility. 20 years of service and 50 years of age.

Amount.

Full Time Firemen. For first 20 years of service, 50% of base pay of a first class fireman. For service in excess of 20 years an additional \$30 per year is added up to a maximum of an additional \$300 per year.

Call Firemen. \$102 per year.

Disability Retirement

Eligibility. Disabled from occupational causes to the extent that no longer able to perform duties of a fireman before being eligible for regular retirement.

Amount. Full time and call firemen - 50% of base pay of a first class fireman.

Member's Death While Active, Or In Deferred Status, Or Retired

Eligibility.

Spouse. Legally married to member at separation from service and residing with member at time of death. (For call firemen, benefit is payable only in the event of a duty related death.)

Child. Younger than age 18.

Amount.

Full Time.

Spouse. 60% of basic pension due member.

Child. 12 1/2% of basic pension due member per child.

Maximum Family Benefit. 80% of basic pension due member.

Call Firemen.

Spouse. 50% of earned pension due member.

Funeral Expense Payment. \$500 for full time firemen.



Vested Deferred. 20 years of service and separated before age 50. Payment beginning is deferred to attainment of age 50.

Post Retirement Adjustments ("Escalator"). Each time the pay of first class firemen is changed, the following benefits are changed by the same percent the first class firemen's pay is changed: Full time firemen's benefits; disability benefits for both full time and call firemen; and benefits for the surviving spouse and dependent children of full time firemen.

Member Contributions. 10.70% of pay of first class firemen. Total member contributions are refundable, without interest, if no monthly benefit is payable upon separation from service. (Contribution provisions are applicable only to full time firemen.)