

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

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May 31, 1983

Board of Trustees

Crookston Fire Department Relief Association

Crookston, Minnesota

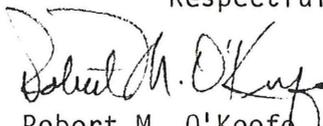
Submitted in this report are the results of the 1982 gain/loss analysis of the financial experiences of the Crookston Fire Department Relief Association.

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

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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.

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.

Crookston 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 (Gain) or Loss *</u>		<u>Contribution Requirements (Gain) or Loss *</u>	
	<u>Active Members</u> (\$ in 1,000)	<u>Retirants &amp; Beneficiaries</u> (\$ in 1,000)	<u>Normal Cost % of Payroll</u>	<u>\$ Payment on UAL</u> (\$ in 1,000)
<u>Age &amp; Service Retirements</u>	\$ (0.14)	\$ N/A	0.09%	\$(0.01)
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	(2.54)	N/A	0.00	(0.17)
b. <u>Death-in Service</u>	(0.84)	N/A	0.06	(0.05)
<u>Withdrawal</u>	0.96	N/A	0.00	0.06
<u>Salary Increases</u>	(8.28)	0.00	N/A	(0.55)
<u>Investment Income</u>	(13.53)	(20.66)	N/A	(2.28)
<u>Post Retirement Mortality</u>	N/A	5.83	N/A	0.39
<u>Contribution</u>	(10.48)	0.00	N/A	(0.70)
<u>Miscellaneous</u>	<u>1.88</u>	<u>0.80</u>	<u>0.00</u>	<u>0.18</u>
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$(32.97)	\$(14.03)	0.15%	\$(3.13)
<u>Changes due to plan amendments</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$(32.97)</u>	<u>\$(14.03)</u>	<u>0.15%</u>	<u>\$(3.13)</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.

Crookston Fire Department Relief Association

Schedule 2.

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

<u>Type of Activity</u>	<u>1/1/79 - 12/31/79</u>		<u>1/1/80 - 12/31/80</u>		<u>1/1/81 - 12/31/81</u>	
	<u>Accrued Liabilities</u>		<u>Accrued Liabilities</u>		<u>Accrued Liabilities</u>	
	<u>(Gain) or Loss</u>		<u>(Gain) or Loss</u>		<u>(Gain) or Loss</u>	
	<u>Active</u>	<u>Retirants &amp;</u>	<u>Active</u>	<u>Retirants &amp;</u>	<u>Active</u>	<u>Retirants &amp;</u>
	<u>Members</u>	<u>Beneficiaries</u>	<u>Members</u>	<u>Beneficiaries</u>	<u>Members</u>	<u>Beneficiaries</u>
	<u>(\$ in 1,000)</u>		<u>(\$ in 1,000)</u>		<u>(\$ in 1,000)</u>	
<u>Age &amp; Service Retirements</u>	\$21.18	\$ N/A	\$ 0.00	\$ N/A	\$(0.09)	\$ N/A
<u>Disability &amp; Death-in-Service</u>						
a. <u>Disability</u>	(1.28)	N/A	(1.43)	N/A	(2.21)	N/A
b. <u>Death-in Service</u>	2.04	N/A	(2.04)	N/A	(0.98)	N/A
<u>Withdrawal</u>	(5.17)	N/A	0.19	N/A	0.55	N/A
<u>Salary Increases</u>	9.20	0.00	28.68	0.00	11.68	0.00
<u>Investment Income</u>	(1.04)	(2.80)	0.47	0.08	(2.44)	(7.28)
<u>Post Retirement Mortality</u>	N/A	1.53	N/A	5.64	N/A	2.06
<u>Contribution</u>	(6.41)	(0.17)	(10.55)	(0.60)	1.48	(7.97)
<u>Miscellaneous</u>	(5.67)	(0.08)	0.41	0.14	1.29	0.00
EXPERIENCE RELATED (GAIN)/LOSS	\$12.85	\$(1.52)	\$15.73	\$5.26	\$ 9.28	\$(13.19)
Method Change for Casualty Cost			11.91			
<u>Changes Due to Plan Amendments</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
TOTAL (GAIN)/LOSS DURING PREVIOUS 3 YEAR PERIOD	<u>\$12.85</u>	<u>\$(1.52)</u>	<u>\$27.64</u>	<u>\$5.26</u>	<u>\$ 9.28</u>	<u>\$(13.19)</u>

Crookston Fire Department Relief Association

Schedule 3.

Employees Active at Both Beginning & End of 1982

Age Group Beg. Year	Full-Time			Volunteers No.
	No.	Beginning Salary	Ending Salary	
20-24				4
25-29	1	\$ 18,874	\$ 18,873	4
30-34				4
35-39	3	57,582	57,579	4
40-44	2	38,708	38,706	1
45-49	1	19,834	19,893	3
50-54				1
55-59				1
60-64	<u>1</u>	<u>24,440</u>	<u>24,441</u>	<u>—</u>
TOTALS	8	\$159,438	\$159,492	22

Employees Active at Either Beginning or End of 1982

Years Service	Full-Time		Volunteer	
	Beginning of Year	End of Year	Beginning of Year	End of Year
0	0	0	1	4
1	0	0	3	1
2	3	0	2	2
3	1	3	2	2
4	0	1	2	2
5 or more	4	4	14	15

Average Age: 41.3 years.

Average Age: 34.3 years.

Average Service: 7.5 years.

Average Service: 7.3 years.

Crookston Fire Department Relief Association  
 Comparative Schedule  
 Of Active Members

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Full-Time Firemen

Valuation Date December 31	Active Members	Valuation Payroll	Average			
			Age	Service	Pay	% Incr.
1978	8	\$105,984	45.1 yrs.	9.0 yrs.	\$13,248	- %
1979	8	118,194	38.3	4.5	14,774	11.5
1980	8	145,186	39.3	5.5	18,148	22.8
1981	8	159,438	40.3	6.5	19,930	9.8
1982	8	159,492	41.3	7.5	19,937	-

Volunteers

1978	26	\$ N/A	35.3 yrs.	6.5 yrs.	\$ N/A	-
1979	24	N/A	36.4	7.3	N/A	N/A
1980	25	N/A	36.4	7.8	N/A	N/A
1981	24	N/A	35.6	8.0	N/A	N/A
1982	27	N/A	34.3	7.3	N/A	N/A

Crookston 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	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
20-24	1	0.1		0.1		0.1		0.1
25-29		0.1		0.1		0.1		0.1
30-34	3	0.2	2	0.1	1	0.1	1	0.1
35-39		*		0.1		0.1		*
40-44	1	*		*				*
45-49		*		*				*
50-54		*		*				
55-59		*		*				
60-64		*		*				*
65-69	—	*	—	*	—	—	—	—
Totals	5	0.5	2	0.5	1	0.4	1	0.4

Total actual during four year period 9  
 Total expected during four year period 1.8

Years Service at Termination	1979		1980		1981		1982	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
0		0.1		0.1		0.1		*
1		0.1		0.1		*		0.1
2	1	*	1	0.1		*	1	*
3	1	0.1				0.1		*
4	1	*	1	0.1		*		*
5 or more	<u>2</u>	<u>0.1</u>	—	<u>0.1</u>	<u>1</u>	<u>0.1</u>	—	<u>0.1</u>
Totals	5	0.5	2	0.5	1	0.4	1	0.4

\* Less than 0.1%

Crookston 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>
20-24		*		*		*		*
25-29		*		*		*		*
30-34		*		*		*		*
35-39		*		*		*		*
40-44		*		*		*		*
45-49		*		*		*		*
50-54		*		*		*		*
55-59		*		*		*		*
60-64		*		*		*		*
65-69		<u>0.1</u>		*				
Totals	<u>0</u>	<u>0.2</u>	<u>0</u>	<u>0.1</u>	<u>0</u>	<u>0.1</u>	<u>0</u>	<u>0.1</u>

Total actual during four year period 0  
 Total expected during four year period 0.5

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>
20-24		*		*		*		
25-29		*		*		*		
30-34		*		*		*		
35-39		*		*		*		
40-44		*		*		*		
45-49		*		*		*		
50-54		*		*		*		
55-59		*		*		*		
60-64		*		*		*		
65-69		*		*				
Totals	<u>0</u>	<u>0.2</u>	<u>0</u>	<u>0.1</u>	<u>0</u>	<u>0.1</u>	<u>0</u>	<u>0.0</u>

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

Crookston Fire Department Relief Association

Schedule 7.

Separations From Active Service  
For Age & Service Retirement

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<u>Age at Termination</u>	<u>1979</u>		<u>1980</u>		<u>1981</u>		<u>1982</u>	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
63							1	1.0
65 & Over	<u>2</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>1</u>	<u>1.0</u>	<u>—</u>	<u>—</u>
TOTALS	2	0.0	0	0.0	1	1.0	1	1.0

Average age at retirement during period examined was 65.5 years.

Average service at retirement during period examined was 19.5 years.

Crookston Fire Department Relief Association

Schedule 8.

Death After Retirement  
(Disability and Service Retirants)

Age at 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>
55-59		0.0667		0.0727		0.0578		0.0198
60-64		0.0217		0.0237		0.0476		0.1232
65-69		0.1765		0.1900	1	0.1574		0.1692
70-74		0.0630				0.0470		0.0505
75-79		0.1734		0.1543		0.1674		0.0795
80-84		0.1127		0.2261		0.2467		0.3700
85-89		0.1798		0.1943		0.2104		
90-94	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>1</u>	<u>—</u>
TOTALS	0	0.7938	0	0.8611	1	0.9343	1	0.8122

Total actual during four year period 2  
 Total expected during four year period 3.4014

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

Crookston 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		Men	Women
	For Life		3.5% Yearly			
	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

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

Crookston Fire Department Relief Association

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

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Full Time

Age & Service Retirement

Eligibility. 20 years of service and 60 years of age.

Amount. 50% of final salary.

Disability Retirement

Eligibility. Disabled as a result of duty to the extent that unable to perform duties of firefighter prior to eligibility for age & service retirement.

Amount. 50% of final salary offset by the amount of worker's compensation being received.

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

Eligibility.

Spouse. Legally married to member prior to separation from service and residing with member at time of death. Benefits terminate upon remarriage.

Child. Younger than age 18.

Amount.

Spouse. The greater of \$900 per year or 50% of earned retirement benefit at date of death.

Child. \$180 per child per year.

Maximum Family Benefit. \$1,260 per year if spouse is living or \$1,080 per year if spouse is deceased. (Survivor benefits are offset by the amount of worker's compensation being received.) In addition there is a \$500 lump sum payment for duty related death or a \$100 lump sum payment for non-duty related death.

Vested Deferred. 20 years of service and separated before age 60. Payment beginning is deferred to attainment of age 60.

Member Contributions. 8% of salary. Total member contributions are refundable, without interest, if no monthly benefit is payable upon separation from service.

## Volunteers

### Age & Service Retirement

Eligibility. 20 years of service and 55 years of age.

Amount. For first 20 years of service \$240 per year. For each year in excess of 20 an additional \$24 per year is added up to a maximum of \$480 per year.

### Disability Retirement

Eligibility. Same as full time.

Amount. (1) Total Disability. \$25 per week for 12 weeks and \$15 per month thereafter.

(2) Partial Disability. \$15 per week for 12 weeks.

Disability benefits are offset by the amount of worker's compensation being received.

### Death Benefits

(1) Duty Related. Lump sum payment of \$500.

(2) Non-Duty Related. Lump sum payment of \$100 plus \$100 for each year of service over 20 years up to a maximum of \$600.

Vested Deferred. 20 years of service and separated before age 55. Payment beginning is deferred to attainment of age 55.

Member Contributions. None.