

The Report of the  
GAIN/LOSS ANALYSIS OF FINANCIAL EXPERIENCE  
During calendar 1979 and 1980  
CITY OF CROOKSTON  
FIRE DEPARTMENT RELIEF ASSOCIATION  
Crookston, Minnesota

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GABRIEL, ROEDER, SMITH & COMPANY

ACTUARIES & CONSULTANTS

2090 First National Building  
Detroit, Michigan 48226  
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June 9, 1981

City of Crookston  
Fire Department Relief Association  
Crookston, Minnesota

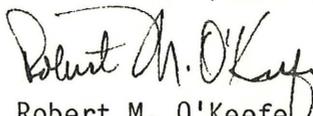
Submitted in this report are the results of the 1979-80 gain/loss analysis of the financial experiences of the Crookston Fire Department Relief Association.

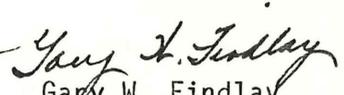
The composite results of this study are reported on Schedules 1(A) and 1(B) and comments regarding the results are on page 12.

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.

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.

## 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.

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 1(A)

Gains & Losses in Accrued Liabilities  
and Changes in Contribution Requirements  
During Calendar 1979

<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>	<u>Normal Cost % of Payroll</u> (\$ in 1,000)	<u>\$ Payment on UAL</u>
<u>Age &amp; Service Retirements</u>	\$21.18	\$ N/A	N/A	\$1.44
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	(1.28)	N/A	N/A	(0.09)
b. <u>Death-in Service</u>	2.04	N/A	N/A	0.14
<u>Withdrawal</u>	(5.17)	N/A	N/A	(0.35)
<u>Salary Increases</u>	9.20	0	N/A	0.63
<u>Investment Income</u>	(1.04)	(2.80)	N/A	(0.26)
<u>Post Retirement Mortality</u>	N/A	1.53	N/A	0.10
<u>Contributions</u>	(6.41)	(0.17)	N/A	(0.45)
<u>Miscellaneous</u>	<u>(5.67)</u>	<u>(0.08)</u>	<u>N/A</u>	<u>(0.39)</u>
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$12.85	\$(1.52)	N/A	\$0.77
<u>Changes due to plan amendments</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$12.85</u>	<u>\$(1.52)</u>	<u>N/A</u>	<u>\$0.77</u>

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 1(B)

Gains & Losses in Accrued Liabilities  
and Changes in Contribution Requirements  
During Calendar 1980

<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>	\$ 0	\$ N/A	(1.13)%	\$ 0
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	(1.43)	N/A	0.10	(0.10)
b. <u>Death-in Service</u>	(2.04)	N/A	(1.50)	(0.14)
<u>Withdrawal</u>	0.19	N/A	0.23	0.01
<u>Salary Increases</u>	28.68	0	N/A	1.98
<u>Investment Income</u>	0.47	0.08	N/A	0.04
<u>Post Retirement Mortality</u>	N/A	5.64	N/A	0.39
<u>Contributions</u>	(10.55)	(0.60)	N/A	(0.77)
<u>Miscellaneous</u>	<u>0.41</u>	<u>0.14</u>	<u>N/A</u>	<u>0.04</u>
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$15.73	\$5.26	(2.30)%	\$1.45
<u>Conversion to UAL Amortization</u>	N/A	N/A	N/A	(0.25)
<u>Change in Funding Method For Death &amp; Disability</u>	11.91	N/A	0.21	0.82
<u>Changes due to plan amendments</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$27.64</u>	<u>\$5.26</u>	<u>(2.09)%</u>	<u>\$2.02</u>

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 2(A)

Employees Active at Both Beginning & End of 1979

Age Group Beg. Year	Full-Time Firemen				Volunteers No.
	No.	Beginning Salary	Ending Salary	% Increase In Salary	
20-24		\$	\$		5
25-29					2
30-34	2	24,504	29,080	18.7%	5
35-39	1	12,960	14,805	14.2	3
40-44	1	12,960	14,890	14.9	2
45-49					2
50-54					1
55-59	1	16,440	18,240	10.9	
60-64					1
65-69					1
TOTALS	5	\$66,864	\$77,015	15.2%	22

Employees Active at Either Beginning or End of 1979

Years Service	Full-Time		Volunteer	
	Beginning of Year	End of Year	Beginning of Year	End of Year
0	0	1	2	1
1	1	2	4	3
2	0	1	1	3
3	0	0	4	0
4	1	0	2	3
5 or more	6	4	13	14

Average Age: 38.3 years 36.4 years

Average Service: 4.5 7.3

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 2(B)

Employees Active at Both Beginning & End of 1980

Age Group Beg. Year	Full-Time Firemen				Volunteers No.
	No.	Beginning Salary	Ending Salary	% Increase In Salary	
20-24		\$	\$	%	4
25-29	1	13,726	17,158	25.0	3
30-34	3	42,806	52,374	22.4	4
35-39	1	14,805	18,058	22.0	4
40-44	2	28,616	35,216	23.1	2
45-49					2
50-54					1
55-59	1	18,240	22,380	22.7	
60-64					1
65-69					1
TOTALS	8	\$118,194	\$145,186	22.8%	22

Employees Active at Either Beginning or End of 1980

Years Service	Full-Time		Volunteers	
	Beginning of Year	End of Year	Beginning of Year	End of Year
0	1	0	1	0
1	2	1	3	4
2	1	2	3	2
3	0	1	0	3
4	0	0	3	0
5 or more	4	4	14	16

Average Age: 39.3 years 36.4 years

Average Service: 5.5 7.8

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 3(A)

Separations From Active Service (Other Than Age & Service Retirement)  
During 1979

Age at Termination	Withdrawal		Disability		Death	
	Actual	Expected	Actual	Expected	Actual	Expected
20-24	1	0.1		*		*
25-29		0.1		*		*
30-34	3	0.2		*		*
35-39		*		*		*
40-44	1	*		*		*
45-49		*		*		*
50-54		*		*		*
55-59		*		*		*
60-64		*		*		*
65-69		*		*		<u>0.1</u>
TOTALS	5	0.5	0	0.2	0	0.2

\* Less than 0.1%

Years Service at Termination	Actual	Expected
0		0.1
1		0.1
2	1	*
3	1	0.1
4	1	*
5 or more	<u>2</u>	<u>0.1</u>
TOTALS	5	0.5

Average age at separation: 32.2 years.

Average service at separation: 4.9 years.

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 3(B)

Separations From Active Service (Other Than Age & Service Retirement)  
During 1980

<u>Age at Termination</u>	<u>Withdrawal</u>		<u>Disability</u>		<u>Death</u>	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
20-24		0.1		*		*
25-29		0.1		*		*
30-34	2	0.1		*		*
35-39		0.1		*		*
40-44		*		*		*
45-49		*		*		*
50-54		*		*		*
55-59		*		*		*
60-64		*		*		*
65-69	—	*	—	*	—	*
TOTALS	2	0.5	0	0.1	0	0.1

\* Less than 0.1%

<u>Years Service at Termination</u>	<u>Actual</u>	<u>Expected</u>
0		0.1
1		0.1
2		0.1
3		
4	1	0.1
5 or more	—	<u>0.1</u>
TOTALS	2	0.5

Average age at separation: 34.0 years.

Average service at separation: 2.8 years.

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 4

Separations From Active Service  
For Age & Service Retirement

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<u>Age at Termination</u>	<u>1979</u>		<u>1980</u>	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
65 & Over	2	—	—	—
TOTALS	2	0.0	0	0.0

Average age at retirement during period examined: 65.5 years.

Average service at retirement during period examined: 18.8 years.

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 5

Death After Retirement  
(Disability and Service Retirants)

<u>Age at Death</u>	1979		1980	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
55-59		0.0667		0.0727
60-64		0.0217		0.0237
65-69		0.1765		0.1900
70-74		0.0630		
75-79		0.1734		0.1543
80-84		0.1127		0.2261
85-89	<u>—</u>	<u>0.1798</u>	<u>—</u>	<u>0.1943</u>
TOTALS	0	0.7938	0	0.8611

Average age at death: N/A.

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. Disability and death before retirement benefits were valued in previous valuations on a terminal funding basis (one year term cost).

The rate of investment return (interest) used in making the valuation was 5.0 percent per annum, compounded annually.

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 For Life		Increasing 3.5% Yearly		Men	Women
	Men	Women	Men	Women		
	45	\$169.61	\$186.84	\$263.23	\$304.86	27.33
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

Sample Pay Adjustment Factors 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

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 (12/31/80) of Benefit Provisions Evaluated and/or Considered

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.