

The Report of the  
GAIN/LOSS ANALYSIS OF FINANCIAL EXPERIENCE  
During calendar 1979 and 1980  
Minneapolis  
Fire Department Relief Association  
Minneapolis, Minnesota

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GABRIEL, ROEDER, SMITH & COMPANY

ACTUARIES & CONSULTANTS

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May 25, 1982

Board of Trustees

Minneapolis Fire Department Relief Association

Minneapolis, Minnesota

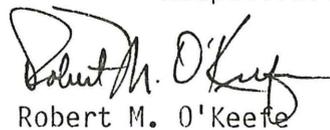
Submitted in this report are the results of the 1979-80 gain/loss analysis of the financial experiences of the Minneapolis Fire Department Relief Association.

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

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.

Minneapolis 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> (\$ in 1,000)	<u>Normal Cost % of Payroll</u>	<u>\$ Payment on UAL</u> (\$ in 1,000)
<u>Age &amp; Service Retirements</u>	\$ 100.1	\$ N/A	0.40%	\$ 4.9
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	446.9	N/A	(0.21)	21.8
b. <u>Death-in Service</u>	(172.1)	N/A	(0.09)	(8.4)
<u>Withdrawal</u>	171.0	N/A	0.00	8.3
<u>Salary Increases</u>	1,661.4	4,573.7	N/A	304.2
<u>Investment Income</u>	0.0	(506.4)	N/A	(24.7)
<u>Post Retirement Mortality</u>	N/A	617.4	N/A	30.1
<u>Contribution</u>	0.0	362.3	N/A	17.7
<u>Miscellaneous</u>	241.6	(4,004.8)	N/A	(183.6)
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$2,448.9	\$1,042.2	0.10%	\$170.3
<u>Changes due to plan amendments</u>	<u>1,117.0</u>	<u>0.0</u>	<u>0.35</u>	<u>54.5</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$3,565.9</u>	<u>\$1,042.2</u>	<u>0.45%</u>	<u>\$224.8</u>

Minneapolis 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 (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>	\$ (2.9)	\$ N/A	0.04 %	\$ 0.1
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	1,359.6	N/A	(0.65)	66.3
b. <u>Death-in Service</u>	(317.1)	N/A	0.18	(15.5)
<u>Withdrawal</u>	165.5	N/A	0.00	8.0
<u>Salary Increases</u>	1,943.0	4,164.0	N/A	298.0
<u>Investment Income</u>	0.0	(456.7)	N/A	(22.3)
<u>Post Retirement Mortality</u>	N/A	206.4	N/A	10.0
<u>Contribution</u>	0.0	321.5	N/A	15.7
<u>Miscellaneous</u>	<u>54.8</u>	<u>26.3</u>	<u>N/A</u>	<u>3.9</u>
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$3,202.9	\$4,261.5	(0.43)%	\$ 364.2
<u>Conversion to UAL Amortization</u>	N/A	N/A	N/A	1,775.1
<u>Change in Funding Method For Death &amp; Disability</u>	1,895.8	(1,820.7)	0.54	3.7
<u>Changes due to plan amendments</u>	<u>0.0</u>	<u>0.0</u>	<u>0.00</u>	<u>0.0</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$5,098.7</u>	<u>\$2,440.8</u>	<u>0.11 %</u>	<u>\$2,143.0</u>

Minneapolis Fire Department Relief Association

Schedule 2(A)

Employees Active at Both Beginning & End of 1979

<u>Age Group Beg. Year</u>	<u>No.</u>	<u>Beginning Salary</u>	<u>Ending Salary</u>	<u>% Increase In Salary</u>
20-24	2	\$ 44,944	\$ 48,312	7.5%
25-29	35	786,520	845,460	7.5
30-34	82	1,842,704	1,980,792	7.5
35-39	96	2,157,312	2,318,976	7.5
40-44	60	1,348,320	1,449,360	7.5
45-49	90	2,022,480	2,174,040	7.5
50-54	75	1,685,400	1,811,700	7.5
55-59	26	584,272	628,056	7.5
60-64	<u>12</u>	<u>269,664</u>	<u>289,872</u>	7.5
TOTALS	478	\$10,741,616	\$11,546,568	7.5%

Employees Active at Either Beginning or End of 1979

<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0	0	43
1	0	0
2	15	0
3	25	15
4	10	24
5 or more	447	439

Average Age: 41.7 years.

Average Service: 13.8 years.

Minneapolis Fire Department Relief Association

Schedule 2(B)

Employees Active at Both Beginning & End of 1980

<u>Age Group Beg. Year</u>	<u>No.</u>	<u>Beginning Salary</u>	<u>Ending Salary</u>	<u>% Increase In Salary</u>
20-24	10	\$ 241,560	\$ 260,220	7.7%
25-29	38	917,928	988,836	7.7
30-34	92	2,222,352	2,394,024	7.7
35-39	95	2,294,820	2,472,090	7.7
40-44	64	1,545,984	1,665,408	7.7
45-49	85	2,053,260	2,211,870	7.7
50-54	71	1,715,076	1,847,562	7.7
55-59	32	772,992	832,704	7.7
60-64	<u>11</u>	<u>265,716</u>	<u>286,242</u>	7.7
TOTALS	498	\$12,029,688	\$12,958,956	7.7%

Employees Active at Either Beginning or End of 1980

<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0	43	0
1	0	43
2	0	0
3	15	0
4	24	15
5 or more	439	440

Average Age: 42.2 years.

Average Service: 14.4 years.

Minneapolis Fire Department Relief Association

Schedule 3(A)

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

<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>
25-29	2	0.8		*		*
30-34		1.5		0.1		0.1
35-39		1.3		0.1		0.2
40-44		0.5		0.1	1	0.2
45-49		0.2	2	0.3		0.7
50-54			1	0.5	1	1.0
55-59			2	0.3		0.6
60-64	—	—	<u>2</u>	—	—	<u>0.4</u>
TOTALS	2	4.3	7	1.4	2	3.2

\* Less than 0.1%

<u>Years Service at Termination</u>	<u>Actual</u>	<u>Expected</u>
0	1.0	0.0
1	0.0	0.0
2	0.0	0.3
3	0.0	0.5
4	1.0	0.2
5 or more	<u>0.0</u>	<u>3.3</u>
TOTALS	2.0	4.3

Average age at separation: 27.0 years.

Average service at separation: 2.3 years.

Minneapolis Fire Department Relief Association

Schedule 3(B)

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

Age at Termination	Withdrawal		Disability		Death	
	Actual	Expected	Actual	Expected	Actual	Expected
20-24		0.2		*		*
25-29		0.8		*		*
30-34	1	1.8	1	0.1		0.2
35-39		1.3	2	0.1		0.2
40-44			0	0.1		0.2
45-49		0.6	1	0.3	1	0.6
50-54		0.1	4	0.5		0.9
55-59			1	0.3		0.6
60-64			1			0.5
65			<u>1</u>			
TOTALS	1	4.8	11	1.5	1	3.3

\* Less than 0.1%

Years Service at Termination	Actual	Expected
0	0	0.9
1	0	0.0
2	0	0.0
3	0	0.3
4	0	0.4
5 or more	<u>1</u>	<u>3.2</u>
TOTALS	1	4.8

Average age at separation: 31.0 years.

Average service at separation: 7.3 years.

Minneapolis 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>
50	1		1	
51	2			
52	0		1	
53	1			
55			2	
57	1			
58				2.0
59	1	7.0		
60	1	5.0	1	6.0
61		1.0		4.0
62		1.0		1.0
63		4.0		1.0
64	1	6.0		2.0
65 & Over	<u>1</u>	<u>1.0</u>	<u>4</u>	<u>5.0</u>
TOTALS	9	25.0	9	21.0

Average age at retirement during period examined: 58.7 years.

Average service at retirement during period examined: 30.5 years.

Minneapolis Fire Department Relief Association

Schedule 5

Death After Retirement  
(Disability and Service Retirants)

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<u>Age at Death</u>	1979		1980	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
30-34		.0034		.0052
35-39		.0052		.0105
40-44		.0087		.0043
45-49		.0863		.0983
50-54	1	.3910		.3364
55-59	1	.5598		.6801
60-64	1	1.7037	2	1.2785
65-69	5	4.0032	7	4.2362
70-74	2	1.8169	1	2.4945
75-79	1	2.0202		1.7473
80-84		2.2523	3	1.9639
85-89	2	2.7567	4	2.6163
90-94	1	0.2937		.2274
95-99	—	—	—	<u>.3077</u>
TOTALS	14	15.9011	17	16.0066

### Comments

This report was prepared using active and retired member data as of December 31, 1981. Actual known changes in active and retired member data from 1978 through 1981 was used to reproduce active and retired members for 1979 and 1980. The data supplied for the annual actuarial valuations was supplied on computer tapes which did contain incorrect data and did not reconcile from year to year. Therefore, differences arose in this Gain and Loss Analysis which resulted in larger miscellaneous losses than would normally be expected.

In 1978, not all assets were reported or contained in the formal actuarial report for 1978. The amount not included was \$4,075,409. This amount is part of the miscellaneous loss shown under Retirants and Beneficiaries for 1979.

## APPENDICES

MINNEAPOLIS 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		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 58, 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

Minneapolis Fire Department Relief Association

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

Age & Service Retirement

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

Amount. For first 20 years of service, 33/80 of base pay. For service in excess of 20 years, an additional 1/80 is provided for each of the first 4 years and 4/80 is added for the 25th year to a maximum of 41/80 of base pay for 25 or more years of service.

Pay Used For Plan Purposes. "Base pay" means the maximum monthly salary of a first grade firefighter.

Disability Retirement

Eligibility.

First Class Disability. Disabled to the extent that no longer able to perform duties of firefighter or any manual labor.

Second Class Disability. Disabled to the extent that no longer able to perform duties of a firefighter but able to perform light manual labor or office work.

Third Class Disability. Disabled to the extent that no longer able to perform duties of a firefighter but able to perform other manual labor.

Amount.

First Class Disability. 40/80 of base pay.

Second Class Disability. 32/80 of base pay.

Third Class Disability. 24/80 of base pay.

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

Eligibility.

Spouse. Married to member at separation from service and residing with member at time of death. (For service or deferred retirant, must have been

married at least one year before separation from service.) Benefits terminate upon remarriage but may be reinstated if marriage terminates.

Child. Younger than age 18 or, if full time student, younger than age 22.

Amount.

Spouse. 21/80 of base pay.

Child. 8/80 of base pay per child. Children's maximum is 19/80 if spouse is receiving or 40/80 if no spouse is receiving.

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 base pay is changed, payments to all benefit recipients are changed simultaneously by the same percent that base pay is changed.

Member Contributions. 8% of base pay. Member contributions are non-refundable.