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

GABRIEL, ROEDER, SMITH & COMPANY

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GABRIEL, ROEDER, SMITH & COMPANY
ACTUARIES & CONSULTANTS
2090 First National Building
Detroit, Michigan 48226
Area 313: 961-3346

May 27, 1983

Board of Trustees

Minneapolis Fire Department Relief Association

Minneapolis, Minnesota

Submitted in this report are the results of the 1982 gain/loss analysis of the financial experiences of the Minneapolis 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

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.

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

Type of Activity	Accrued Liabilities (Gain) or Loss *		Contribution Requirements (Gain) or Loss *	
	Active Members	Retirants & Beneficiaries	Normal Cost % of Payroll	$ Payment on UAL
	($ in 1,000)			($ in 1,000)
Age & Service Retirements	$ 181.7	$ N/A	(0.02)%	$ 12.10
Disability & Death-in-Service				
a. Disability	(45.5)	N/A	0.00	(3.03)
b. Death-in Service	380.6	N/A	0.00	25.36
Withdrawal	570.4	N/A	0.00	38.01
Salary Increases	1,558.0	2,138.9	N/A	246.36
Investment Income	0.0	(5,095.5)	N/A	(339.56)
Post Retirement Mortality	N/A	310.2	N/A	20.67
Contribution	0.0	1,446.7	N/A	96.41
Miscellaneous	53.4	53.4	0.00	7.12
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	$2,698.6	$(1,146.3)	(0.02)%	$ 103.44
Changes due to plan amendments	0.0	0.0	0.00	0.00
TOTAL (GAIN)/LOSS DURING YEAR	$2,698.6	$(1,146.3)	(0.02)%	$ 103.44

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

Minneapolis 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 Accrued Liabilities (Gain) or Loss		1/1/80 - 12/31/80 Accrued Liabilities (Gain) or Loss		1/1/81 - 12/31/81 Accrued Liabilities (Gain) or Loss	
	Active Members	Retirants & Beneficiaries	Active Members	Retirants & Beneficiaries	Active Members	Retirants & Beneficiaries
	($ in 1,000)		($ in 1,000)		($ in 1,000)	
Age & Service Retirements	$ 100.1	$ N/A	$ (2.9)	$ N/A	$ (65.8)	$ N/A
Disability & Death-in-Service						
a. Disability	446.9	N/A	1,359.6	N/A	(17.9)	N/A
b. Death-in Service	(172.1)	N/A	(317.1)	N/A	(82.2)	N/A
Withdrawal	171.0	N/A	165.5	N/A	(207.0)	N/A
Salary Increases	1,661.4	4,573.7	1,943.0	4,164.0	2,222.5	3,545.2
Investment Income	0.0	(506.4)	0.0	(456.7)	0.0	(330.2)
Post Retirement Mortality	N/A	617.4	N/A	206.4	N/A	443.3
Contribution	0.0	362.3	0.0	321.5	0.0	1,226.6
Miscellaneous	241.6	(4,004.8)	54.8	26.3	64.7	171.2
EXPERIENCE RELATED (GAIN)/LOSS	$2,448.9	$1,042.2	$3,202.9	$4,261.5	$1,914.3	$5,056.1
Method Change for Casualty Cost			1,895.8	(1,820.7)		
Changes Due to Plan Amendments	1,117.0	0.0	0.0	0.0	0.0	0.0
TOTAL (GAIN)/LOSS DURING PREVIOUS 3 YEAR PERIOD	$3,565.9	$1,042.2	$5,098.7	$2,440.8	$1,914.3	$5,056.1

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Schedule 3.

Employees Active at Both Beginning & End of 1982

Age Group Beg. Year	No.	Beginning Salary	Ending Salary	% Increase In Salary
20-24	2	$ 56,272	$ 59,716	6.1%
25-29	25	703,400	746,450	6.1
30-34	84	2,363,424	2,508,072	6.1
35-39	87	2,447,832	2,597,646	6.1
40-44	84	2,363,424	2,508,072	6.1
45-49	63	1,772,568	1,881,054	6.1
50-54	75	2,110,200	2,239,350	6.1
55-59	46	1,294,256	1,373,468	6.1
60-64	7	196,952	209,006	6.1
65-69	1	28,136	29,858	6.1
TOTALS	474	$13,336,464	$14,152,692	6.1%

Employees Active at Either Beginning or End of 1981

Years Service	Beginning of Year	End of Year
0	0	0
1	0	0
2	43	43
3	0	0
4	0	0
5 or more	442	431

Average Age: 43.6 years.

Average Service: 15.8 years.

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Schedule 4.

Comparative Schedule

Of Active Members

Valuation Date December 31	Active Members	Valuation Payroll	Average Age	Average Service	Average Pay	% Incr.
1978	497	$11,168,664	42.4 yrs.	14.9 yrs.	$22,472	- %
1979	515	12,440,340	41.8	14.3	24,156	7.5
1980	496	12,906,912	42.4	14.8	26,022	7.7
1981	485	13,645,960	42.8	14.9	28,136	8.1
1982	474	14,152,692	43.6	15.8	29,858	6.1

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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				0.2		0.1		
25-29	2	0.8		0.8		0.6		0.5
30-34		1.5	1	1.8		1.7		1.5
35-39		1.3		1.3		1.1		1.2
40-44		0.5				0.7		0.7
45-49		0.2		0.6		0.1		0.1
50-54				0.1				
Totals	2	4.3	1	4.8	0	4.3	0	4.0

Total actual during four year period 3
Total expected during four year period 17.4

Years Service at Termination	1979		1980		1981		1982	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
0	1			0.9				
1						0.9		
2		0.3						0.9
3		0.5		0.3				
4	1	0.2		0.4		0.3		
5 or more		3.3	1	3.2		3.1		3.1
Totals	2	4.3	1	4.8	0	4.3	0	4.0

* Less than 0.1%

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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	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
20-24				*		*		*
25-29		*		*		*		*
30-34		0.1		0.2		0.2	1	0.1
35-39		0.2		0.2		0.2		0.2
40-44	1	0.2		0.2		0.3		0.3
45-49		0.7	1	0.6		0.5		0.4
50-54	1	1.0		0.9		0.9		1.0
55-59		0.6		0.6		0.8		0.8
60-64	—	0.4	—	0.5	—	0.3	—	0.3
Totals	2	3.2	1	3.3	0	3.2	1	3.2

Total actual during four year period 4
Total expected during four year period 12.9

Disability Separations

Age at Time of Disability	1979		1980		1981		1982	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
20-24				*		*		*
25-29		*		*		*		*
30-34		0.1	1	0.1		0.1		0.1
35-39		0.1	2	0.1		0.1		0.1
40-44		0.1		0.1		0.2		0.2
45-49	2	0.3	1	0.3		0.2		0.2
50-54		0.5		0.5		0.5		0.5
55-59	—	0.3	—	0.3	—	0.3	—	0.3
Totals	2	1.4	4	1.5	0	1.5	0	1.5

Total actual during four year period 6
Total expected during four year period 5.9

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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		4				2	
51	2		1				1	
52			1					
53	1				1			
54	1				2			
55	1		2				3	
56					1		1	
57	1		1		3			
58				2.0	1	3.0		3.0
59	1	7.0			1	5.0		6.0
60	1	5.0	2	6.0				4.0
61		1.0		4.0		3.0		
62		1.0		1.0	1	4.0		3.0
63	2	4.0		1.0	1	1.0	1	3.0
64	1	6.0		2.0	1	1.0		
65 & Over	1	1.0	5	5.0	1	2.0		1.0
TOTALS	13	25.0	16	21.0	13	19.0	8	20.0

Average age at retirement during period examined was 57.1 years.

Average service at retirement during period examined was 29.4 years.

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Schedule 8.

Death After Retirement
(Disability and Service Retirants)

Age at Death	1979		1980		1981		1982	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
30-34		.0034		.0052		.0035		.0018
35-39		.0052		.0105		.0042		.0065
40-44		.0087		.0043		.0143		.0105
45-49		.0863		.0983		.0643		.0498
50-54	1	.3910		.3364		.2664		.2897
55-59	1	.5598		.6801	1	.8989	1	.9458
60-64	1	1.7037	2	1.2785	1	1.0949		.8871
65-69	5	4.0032	7	4.2362	1	4.3036	4	3.9537
70-74	2	1.8169	1	2.4945	1	2.8669	3	3.4408
75-79	1	2.0202		1.7473	4	1.7500	1	2.0846
80-84		2.2523	3	1.9639	2	1.6936	2	1.1925
85-89	2	2.7567	4	2.6163	2	2.6879	3	2.5389
90-94	1	0.2937		.2274		.4718		.9605
95+				.3077		.3217		.3368
TOTALS	14	15.9011	17	16.0066	12	16.4420	14	16.6990

Total actual during four year period 57
Total expected during four year period 65.0487

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

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.

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 For Life		Increasing 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 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

Sample Ages	Present Pay Resulting in Pay of $1,000 at Age 60	Percent Increase in Pay During Next Year
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:

Sample Ages	% of Active Members Becoming Disabled Within Next Year
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 (12/31/82) 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. 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 retirement, 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 20/80 if spouse is receiving or 41/80 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.