

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

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Board of Trustees

Moorhead Fire Department Relief Association

Moorhead, Minnesota

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

Moorhead 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 & Beneficiaries</u>	<u>Normal Cost % of Payroll</u>	<u>\$ Payment on UAL</u> (\$ in 1,000)
<u>Age & Service Retirements</u>	\$ (5.2)	\$ N/A	(0.01)%	\$(0.4)
<u>Disability & Death-in-Service</u>				
a. <u>Disability</u>	(5.7)	N/A	(0.01)	(0.4)
b. <u>Death-in Service</u>	(5.7)	N/A	0.00	(0.4)
<u>Withdrawal</u>	(34.6)	N/A	0.00	(2.3)
<u>Salary Increases</u>	(118.6)	0.0	N/A	(7.9)
<u>Investment Income</u>	(65.8)	(127.9)	N/A	(12.9)
<u>Post Retirement Mortality</u>	N/A	26.9	N/A	1.8
<u>Contribution</u>	105.1	0.0	N/A	7.0
<u>Miscellaneous</u>	(494.2)	(1.3)	(5.56)	(33.0)
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$(624.7)	\$(102.3)	(5.58)%	\$(48.5)
<u>Changes due to plan amendments</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$(624.7)</u>	<u>\$(102.3)</u>	<u>(5.58)%</u>	<u>\$(48.5)</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.

Moorhead 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 &</u>	<u>Active</u>	<u>Retirants &</u>	<u>Active</u>	<u>Retirants &</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 & Service Retirements</u>	\$ 0.0	\$ N/A	\$ (0.7)	\$ N/A	\$ 31.0	\$ N/A
<u>Disability & Death-in-Service</u>						
a. <u>Disability</u>	(3.4)	N/A	(3.6)	N/A	(4.2)	N/A
b. <u>Death-in Service</u>	2.9	N/A	1.9	N/A	2.9	N/A
<u>Withdrawal</u>	(16.4)	N/A	9.7	N/A	16.3	N/A
<u>Salary Increases</u>	79.7	0.0	103.4	0.0	373.0	0.0
<u>Investment Income</u>	(14.5)	(6.5)	(14.2)	(8.1)	(52.2)	2.1
<u>Post Retirement Mortality</u>	N/A	6.8	N/A	10.5	N/A	11.9
<u>Contribution</u>	34.6	24.1	(16.1)	(10.6)	(5.0)	67.2
<u>Miscellaneous</u>	<u>0.2</u>	<u>(0.5)</u>	<u>0.0</u>	<u>0.0</u>	<u>97.8</u>	<u>0.5</u>
EXPERIENCE RELATED (GAIN)/LOSS	\$83.1*	\$23.9	\$ 80.4	\$(8.2)	\$459.6	\$81.7
Method Change for Casualty Cost			37.0			
<u>Changes Due to Plan Amendments</u>	<u>0.0</u>	<u>0.0</u>	<u>681.6</u>	<u>0.0</u>	<u>331.3</u>	<u>13.0</u>
TOTAL (GAIN)/LOSS DURING PREVIOUS 3 YEAR PERIOD	<u>\$83.1*</u>	<u>\$23.9</u>	<u>\$799.0</u>	<u>\$(8.2)</u>	<u>\$790.9</u>	<u>\$94.7</u>

* These amounts are based upon the revised valuation results.

Moorhead Fire Department Relief Association

Schedule 3.

Employees Active at Both Beginning & End of 1982

<u>Age Group Beg. Year</u>	<u>No.</u>	<u>Beginning Salary</u>	<u>Ending Salary</u>	<u>% Increase In Salary</u>
25-29	1	\$ 20,156	\$ 20,222	0.3 %
30-34	5	96,393	93,571	(2.9)
35-39	10	203,350	204,952	0.8
40-44	5	105,915	107,319	1.3
45-49	6	146,485	148,919	1.7
50-54	1	27,120	25,091	(7.5)
60-64	<u>1</u>	<u>27,120</u>	<u>27,120</u>	0.0
TOTALS	29	\$626,539	\$627,194	0.1%

Employees Active at Either Beginning or End of 1982

<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0		
1		
2	1	
3		
4		
5 or more	30	29

Average Age: 40.9 years.

Average Service: 15.1 years.

Moorhead Fire Department Relief Association

Schedule 4.

Comparative Schedule

Of Active Members

<u>Valuation Date December 31</u>	<u>Active Members</u>	<u>Valuation Payroll</u>	<u>Average</u>			
			<u>Age</u>	<u>Service</u>	<u>Pay</u>	<u>% Incr.</u>
1978	33	\$531,714	37.3 yrs.	11.8 yrs.	\$16,113	- %
1979	33	569,147	38.2	12.6	17,247	7.0
1980	33	617,850	39.2	13.6	18,723	8.6
1981	31	671,035	39.2	13.5	21,646	15.6
1982	29	627,194	40.9	15.1	21,627	0.0

Moorhead 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		*						
25-29		0.1		0.1		0.1	1	*
30-34	1	0.1		0.1		0.1	1	0.1
35-39		0.2		0.2		0.1		0.1
40-44		*		*		*		0.1
45-49				*		*		*
Totals	1	0.4	0	0.4	0	0.4	2	0.3

Total actual during four year period 3
 Total expected during four year period 1.5

Years Service at Termination	1979		1980		1981		1982	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
0								
1								
2							1	*
3		0.1						
4				0.1		*		
5 or more	<u>1</u>	<u>0.3</u>		<u>0.3</u>		<u>0.3</u>	<u>1</u>	<u>0.3</u>
Totals	1	0.4	0	0.4	0	0.4	2	0.3

* Less than 0.1%

Moorhead 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>
25-29		*		*				
30-34		*		*		*		*
35-39		0.1		*		*		*
40-44		*		0.1		*		*
45-49		*		*		*		*
50-54		*		*		*		
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

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>
25-29		*		*				
30-34		*		*		*		*
35-39		0.1		*		*		*
40-44		*		0.1		*		*
45-49		*		*		*		*
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

Moorhead Fire Department Relief Association

Schedule 7.

Separations From Active Service
For Age & Service Retirement

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>
54					1			
55					1			
59				1.0				
60						1.0		
61								<u>1.0</u>
TOTALS	0	0.0	0	1.0	2	1.0	0	1.0

Average age at retirement during period examined was 55.0 years.

Average service at retirement during period examined was 31.0 years.

Moorhead 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>
50-54		0.0132				0.0132		
55-59			0.0142		0.0296		0.0462	
60-64					0.0217		0.0237	
65-69		0.1225		0.0846		0.0438		
70-74		0.1013		0.1560		0.2148		0.2102
75-79		0.1674		0.0795		0.0863		0.1609
80-84	<u>—</u>	<u>—</u>	<u>—</u>	<u>0.1026</u>	<u>—</u>	<u>0.1126</u>	<u>—</u>	<u>0.1235</u>
TOTALS	0	0.4044	0	0.4369	0	0.5220	0	0.5655

Total actual during four year period 0

Total expected during four year period 1.9288

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.

Change in Methods

The amounts shown in the miscellaneous category primarily reflect a change in the method of valuing the spouses benefit.

APPENDICES

Moorhead 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
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

<u>Sample Ages</u>	Present Pay Resulting in <u>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

Moorhead Fire Department Relief Association

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

Full Paid Firemen

Age & Service Retirement

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

Amount. For first 20 years of service, 50% of "final average salary". For each year in excess of 20 an additional 2% is added up to a maximum of 80% at 35 years of service. The benefit is then increased by an amount equal to 3% of final average salary.

Final Average Salary means the average salary earned during the last 5 years of employment on which contributions were made.

Disability Retirement

Eligibility. Totally and permanently disabled to the extent that no longer able to perform the duties of a firefighter before being eligible for age & service retirement.

Amount. Same as age & service benefit assuming 20 years service and 55 years of age. If less than 5 years service, final average salary is based on actual service to the time of the disability.

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. Benefits terminate upon remarriage.

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

Amount.

Spouse. 30% of average monthly salary for six months preceeding separation from service.

Child. 1/3 of spouse benefit per child.

Maximum Family Benefit. \$5,400 per year.

Vested Deferred. 10 years of service and separated before age 55. Payment beginning is deferred to attainment of eligibility for age & service retirement had active membership continued. Benefit of 2 1/2% of final average salary times years of service with maximum of 50% of final average salary.

Post Retirement Adjustments ("Escalator"). Benefit payments to retired members and beneficiaries are increased each January by the lesser of the following percentages: (1) 3 1/2% or (2) the preceeding year's percentage increase in the salary of a first grade firefighter.

Member Contributions. 8% of salary. Total member contributions are refundable, with 3% interest, compounded annually, if no monthly benefit is payable upon separation from service. (No member contributions are made beyond 35 years of service.)

Funeral Expenses. \$1,000 lump sum payment upon death of active or retired member.

Volunteer Firemen

Age & Service Retirement

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

Amount. \$576 per year.

Disability Retirement

Eligibility. Totally and permanently disabled to the extent that no longer able to perform the duties of a firefighter before being eligible for age & service retirement. (Must be duty related.)

Amount. \$480 per year.

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

Eligibility. Same as full paid firemen.

Amount.

Spouse. \$480 per year.

Child. \$180 per year.

Funeral Expenses. \$500 lump sum payment upon death of active or retired member.

Vested Deferred. 4 years of service and separated before age 60. Payment beginning is deferred to attainment of age for eligibility for age & service retirement had active membership continued. Benefit is \$12 per year for each year of service with maximum of \$480 per year.

Post Retirement Adjustment ("Escalator"). Benefit payments to retired members are increased each January by the lesser of the following percentages: (1) 3 1/2% or (2) the preceeding year's percentage increase in the salary of a first grade firefighter.

Member Contributions. \$1 per month for up to 20 years of service. No contributions for service beyond 20 years.