

The Report of the  
GAIN/LOSS ANALYSIS OF FINANCIAL EXPERIENCE  
During calendar 1979 and 1980  
CITY OF MOORHEAD  
POLICE RELIEF ASSOCIATION  
Moorhead, Minnesota

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

July 30, 1981

City of Moorhead  
Police Relief Association  
Moorhead, Minnesota

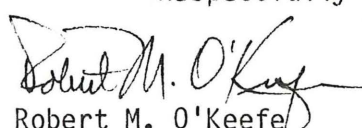
Submitted in this report are the results of the 1979-80 gain/loss analysis of the financial experiences of the City of Moorhead Police Relief Association.

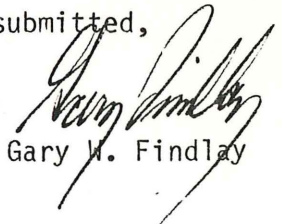
The composite results of this study are reported on Schedules 1(A) and 1(B) and comments regarding the results are on page 12.

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

### 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 POLICE 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</u> <u>(Gain) or Loss</u>		<u>Contribution Requirements</u> <u>(Gain) or Loss</u>	
	<u>Active</u> <u>Members</u> <u>(\$ in 1,000)</u>	<u>Retirants &amp;</u> <u>Beneficiaries</u> <u>(\$ in 1,000)</u>	<u>Normal Cost</u> <u>% of Payroll</u> <u>(\$ in 1,000)</u>	<u>\$ Payment</u> <u>on UAL</u> <u>(\$ in 1,000)</u>
<u>Age &amp; Service Retirements</u>	\$ 0	\$ N/A	N/A	\$ 0
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	(5.2)	N/A	N/A	(0.25)
b. <u>Death-in Service</u>	(14.4)	N/A	N/A	(0.70)
<u>Withdrawal</u>	(18.7)	N/A	N/A	(0.91)
<u>Salary Increases</u>	228.4	0		11.15
<u>Investment Income</u>	N/A	N/A		N/A
<u>Post Retirement Mortality</u>	N/A	(41.3)	N/A	(2.02)
<u>Contributions</u>	N/A	N/A		
<u>Miscellaneous</u>	(212.1)	N/A		(10.36)
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$(22.0)	\$(41.3)	N/A	\$(3.09)
<u>Changes due to plan amendments</u>	<u>401.7</u>	<u>82.7</u>		<u>23.64</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$379.7</u>	<u>\$ 41.4</u>	<u>N/A</u>	<u>\$20.55</u>

MOORHEAD POLICE 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> (\$ in 1,000)	<u>\$ Payment on UAL</u> (\$ in 1,000)
<u>Age &amp; Service Retirements</u>	\$ 35.6	\$ N/A	(0.29)%	\$ 1.74
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	57.3	N/A	(0.10)	2.80
b. <u>Death-in Service</u>	(1.4)	N/A	(0.21)	(0.07)
<u>Withdrawal</u>	(29.0)	N/A	(0.05)	(1.42)
<u>Salary Increases</u>	105.7	0		5.16
<u>Investment Income</u>	(43.7)	(10.8)		(2.66)
<u>Post Retirement Mortality</u>	N/A	(3.6)	N/A	(0.18)
<u>Contributions</u>	(22.7)	(14.5)		(1.82)
<u>Miscellaneous</u>	<u>3.8</u>	<u>4.3</u>		<u>0.40</u>
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$105.6	\$(24.6)	(0.65)%	\$ 3.95
<u>Conversion to UAL Amortization</u>			N/A	12.33
<u>Change in Funding Method For Death &amp; Disability</u>	84.1	N/A	0.16	4.10
<u>Changes due to plan amendments</u>	<u>165.8</u>	<u>154.6</u>	<u>9.46*</u>	<u>15.64</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$355.5</u>	<u>\$130.0</u>	<u>8.97%</u>	<u>\$36.02</u>

\* 6.17% was due to 1979 plan amendments. 3.29% was due to 1980 plan amendments.

MOORHEAD POLICE 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	\$ 24,298	\$ 30,373	25.0%
25-29	11	147,725	184,655	25.0
30-34	7	105,458	131,822	25.0
35-39	7	112,619	140,774	25.0
40-44	3	42,168	52,710	25.0
45-49	2	32,058	40,073	25.0
50-54	1	18,598	23,248	25.0
55-59	3	52,810	66,012	25.0
TOTALS	36	\$535,734	\$669,667	25.0%

Employees Active at Either Beginning or End of 1979

<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0	1	0
1	5	1
2	3	5
3	7	3
4	0	5
5 or more	23	22

Average Age: 36.2 years.

Average Service: 10.3 years.



MOORHEAD POLICE 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	2	\$ 30,907	\$ 38,526	24.7%
25-29	6	102,472	117,255	14.4
30-34	10	180,987	202,400	11.8
35-39	7	140,774	155,777	10.7
40-44	1	17,104	18,960	10.9
45-49	2	39,692	44,784	12.8
50-54	1	23,248	26,820	15.4
55-59	<u>1</u>	<u>21,584</u>	<u>25,140</u>	16.5
TOTALS	30	\$556,768	\$629,662	13.1%

Employees Active at Either Beginning or End of 1980

<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0	0	0
1	1	1
2	5	1
3	3	5
4	5	1
5 or more	22	23

Average Age: 35.4 years.

Average Service: 9.9 years.

MOORHEAD POLICE 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>
20-24	1	0.1		*		*
25-29		0.3		*		*
30-34		0.1		*		*
35-39	1	0.1		*		*
40-44	1			*		*
45-49				*		*
50-54				*		*
55-59				*		*
TOTALS	3	0.6	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		*
2		0.1
3		0.1
4	2	*
5 or more	<u>1</u>	<u>0.1</u>
TOTALS	3	0.5

Average age at separation: 35.0 years.

Average service at separation: 5.2 years.

MOORHEAD POLICE 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		*		*		*
25-29	2	0.2		*		*
30-34		0.1		*		*
35-39		0.1		*		*
40-44	1	0.1		*		*
45-49		*	1	*		*
50-54		*		*		*
55-59		*		*		*
TOTALS	3	0.6	1	0.1	0	0.1

\* Less than 0.1%

<u>Years Service at Termination</u>	<u>Actual</u>	<u>Expected</u>
0		*
1		0.1
2		*
3		0.1
4	2	*
5 or more		*
TOTALS	2	0.4

Average age at separation: 27.5 years.

Average service at separation: 3.7 years.

MOORHEAD POLICE 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>
59			1	
60	<u>—</u>	<u>—</u>	<u>1</u>	<u>—</u>
TOTALS	0	0.0	2	0.0

Average age at retirement during period examined: 59.5 years.

Average service at retirement during period examined: 27.6 years.

MOORHEAD POLICE RELIEF ASSOCIATION

Schedule 5

Death After Retirement  
(Disability and Service Retirants)

<u>Age at Death</u>	<u>1979</u>		<u>1980</u>	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
45-49				0.0059
55-59		0.0093		0.0198
60-64	1	0.0886	1	0.0623
65-69		0.0706		0.1413
70-74		0.0543		0.0584
80-84	—	<u>0.1235</u>	—	—
TOTALS	1	0.3463	1	0.2877

Average age at death: 62.0 years.



## Comments

### Miscellaneous Loss, 1979

A financial statement showing various sources of income and expense was not available. As a result the gain or loss arising from Investment Income and Contributions are lumped in Miscellaneous.

APPENDICES

MOORHEAD POLICE RELIEF ASSOCIATION

Valuation Methods and Assumptions

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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 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

## Moorhead Police Relief Association

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

#### Age & Service Retirement

Eligibility. 10 years of service and 55 years of age.

Amount. For first 20 years of service, 2 1/2% of "final average salary" per year. For each year in excess of 20 an additional 2% is added up to a maximum of 80% at 35 years of service. Members retiring after 6/15/80 receive an additional \$90 per month. (The latter benefit is not subject to the post retirement adjustment provisions.)

Final Average Salary means the average salary earned during the high 5 consecutive 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 police officer before being eligible for age & service retirement.

Amount. Benefit the member would have been eligible for had he been age 55 with 20 years of service. Disability benefits are offset by the amount of any worker's compensation benefit being received.

#### 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 earnings during last 6 months service.

Child. One-Third of spouse benefit.

Maximum Family Benefit. \$5,400 annually.



Vested Deferred. 4 years of service if hired prior to 7/1/79 or 10 years of service if hired after 7/1/79. Payment beginning is deferred to attainment of age 55 or eligibility for age & service retirement had active membership continued.

Post Retirement Adjustments ("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 patrolman.

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.)