

The Report of the  
GAIN/LOSS ANALYSIS OF FINANCIAL EXPERIENCE  
During calendar 1981 & 1982  
Columbia Heights Fire Department  
Relief Association (Volunteer Division)  
Columbia Heights, Minnesota

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Board of Trustees  
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Relief Association (Volunteer Division)  
Columbia Heights, Minnesota

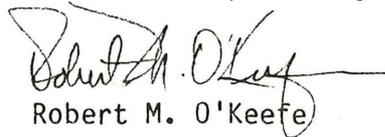
Submitted in this report are the results of the 1982 gain/loss analysis of the financial experiences of the Columbia Heights Fire Department Relief Association (Volunteer Division).

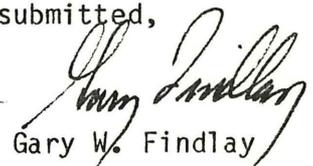
The composite results of this study are reported on Schedule 1, and comments regarding the results are on page 12.

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

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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.

Columbia Heights Fire Department Relief Association (Volunteer Division)

Schedule 1.

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

<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> (\$ in 1,000)	<u>Retirants &amp;</u> <u>Beneficiaries</u> (\$ in 1,000)	<u>Normal Cost</u> \$ (\$ in 1,000)	<u>\$ Payment</u> <u>on UAL</u> (\$ in 1,000)
<u>Age &amp; Service Retirements</u>	\$ 0.0	\$ N/A	\$262	\$0.0
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	(1.0)	N/A	52	0.0
b. <u>Death-in Service</u>	(0.6)	N/A	56	0.0
<u>Withdrawal</u>	(2.9)	N/A	5	0.0
<u>Salary Increases</u>	0.0	0.0	N/A	0.0
<u>Investment Income</u>	(29.6)	(43.0)	N/A	0.0
<u>Post Retirement Mortality</u>	N/A	2.3	N/A	0.0
<u>Contribution</u>	(0.2)	0.0	N/A	0.0
<u>Miscellaneous</u>	<u>1.5</u>	<u>1.8</u>	<u>0</u>	<u>0.0</u>
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	<u>\$(32.8)</u>	<u>\$(38.9)</u>	<u>\$375</u>	<u>0.0</u>
<u>Changes due to plan amendments</u>	0.0	0.0	0	0.0
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$(32.8)</u>	<u>\$(38.9)</u>	<u>\$375</u>	<u>0.0</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.

Columbia Heights Fire Department Relief Association (Volunteer Division)

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>Active</u>	<u>Retirants &amp;</u>	<u>Active</u>	<u>Retirants &amp;</u>	<u>Active</u>	<u>Retirants &amp;</u>
	<u>Members</u>	<u>Beneficiaries</u>	<u>Members</u>	<u>Beneficiaries</u>	<u>Members</u>	<u>Beneficiaries</u>
	(\$ in 1,000)		(\$ in 1,000)		(\$ in 1,000)	
<u>Age &amp; Service Retirements</u>	\$ 0.0	\$ N/A	\$ 0.0	\$ N/A	\$13.3	\$ N/A
<u>Disability &amp; Death-in-Service</u>						
a. <u>Disability</u>	(0.7)	N/A	(0.7)	N/A	(0.8)	N/A
b. <u>Death-in Service</u>	(0.8)	N/A	(0.8)	N/A	(0.5)	N/A
<u>Withdrawal</u>	(2.6)	N/A	(0.4)	N/A	12.2	N/A
<u>Salary Increases</u>	0.0	0.0	0.0	0.0	0.0	0.0
<u>Investment Income</u>	(9.4)	(9.9)	(9.5)	(7.0)	8.6	9.3
<u>Post Retirement Mortality</u>	N/A	2.4	N/A	(0.6)	N/A	5.6
<u>Contribution</u>	0.0	0.0	0.0	0.0	1.3	0.0
<u>Miscellaneous</u>	<u>0.5</u>	<u>0.2</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
EXPERIENCE RELATED (GAIN)/LOSS	\$(13.0)	\$(7.3)	\$(11.4)	\$(7.6)	\$34.1	\$14.9
Method Change for Casualty Cost			6.9			
<u>Changes Due to Plan Amendments</u>	0.0	0.0	7.8	34.7	0.0	0.0
TOTAL (GAIN)/LOSS DURING PREVIOUS 3 YEAR PERIOD	<u>\$(13.0)</u>	<u>\$(7.3)</u>	<u>\$ 3.3</u>	<u>\$27.1</u>	<u>\$34.1</u>	<u>\$14.9</u>

Columbia Heights Fire Department Relief Association (Volunteer Division)

Schedule 3(A)

Employees Active at Both Beginning & End of 1981

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<u>Age Group</u> <u>Beg. Year</u>	<u>No.</u>	<u>Beginning Salary</u>	<u>Ending Salary</u>	<u>% Increase In Salary</u>
Under 20	1			
25-29	5			
30-34	4			
40-44	6			
45-49	<u>1</u>			
TOTALS	17	N/A	N/A	N/A

Employees Active at Either Beginning or End of 1982

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<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0	2	4
1	2	2
2	5	1
3		5
4		
5 or more	11	9

Average Age: 31.7 years.

Average Service: 5.8 years.

Columbia Heights Fire Department Relief Association (Volunteer Division)

Schedule 3(B)

Employees Active at Both Beginning & End of 1982

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<u>Age Group</u> <u>Beg. Year</u>	<u>No.</u>	<u>Beginning Salary</u>	<u>Ending Salary</u>	<u>% Increase In Salary</u>
Under 20	1			
20-24	4			
25-29	4			
30-34	3			
35-39	1			
40-44	5			
45-49	<u>2</u>			
Totals	20	N/A	N/A	N/A

Employees Active at Either Beginning or End of 1982

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<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0	4	2
1	2	4
2	1	2
3	5	1
4		5
5 or more	9	8

Average Age: 32.1 years.

Average Service: 6.3 years.

Columbia Heights Fire Department Relief Association (Volunteer Division)

Schedule 4.

Comparative Schedule

Of Active Members

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<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>
1978	20	\$N/A	33.3 yrs.	5.8 yrs.	\$N/A
1979	20	N/A	33.5	6.3	N/A
1980	20	N/A	34.3	7.2	N/A
1981	21	N/A	31.7	5.8	N/A
1982	22	N/A	32.1	6.3	N/A

Columbia Heights Fire Department Relief Association (Volunteer Division)

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

Total actual during four year period 6  
 Total expected during four year period 1.3

Years Service at Termination	1979		1980		1981		1982	
	Actual	Expected	Actual	Expected	Actual	Expected	Actual	Expected
0		0.2		0.1		0.1		0.1
1				0.2	1	0.1		0.1
2	1		2			0.1		0.1
3								0.1
4								*
5 or more	—	0.1	—	*	—	*	1	*
Totals	1	0.3	2	0.3	1	0.3	1	0.4

\* Less than 0.1%

Columbia Heights Fire Department Relief Association (Volunteer Division)

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>
20-24		*						
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

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>
20-24		*						
25-29		*						
30-34		*						
35-39		*						
40-44	—	*	—	—	—	—	—	—
Totals	0	0.0	0	0.0	0	0.0	0	0.0

Total actual during four year period 0  
 Total expected during four year period 0.0

Columbia Heights Fire Department Relief Association (Volunteer Division)

Schedule 7.

Separations From Active Service  
For Age & Service Retirement

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<u>Age at Termination</u>	<u>1979</u>		<u>1980</u>		<u>1981</u>		<u>1982</u>	
	<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					1			
TOTALS	0	0.0	0	0.0	1	0.0	0	0.0

Average age at retirement during period examined was 49.0 years.

Average service at retirement during period examined was 20.4 years.

Columbia Heights Fire Department Relief Association (Volunteer Division)

Schedule 8.

Death After Retirement  
(Disability and Service Retirants)

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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>
45-49					0.0081			
50-54		0.0222		0.0243	0.0263		0.0181	
55-59		0.0153		0.0166	0.0181		0.0483	
65-69		0.0765		0.0352	0.0379		0.0408	
70-74		0.1446		0.2023	0.2175		0.2340	
75-79	<u>—</u>	<u>0.1416</u>	<u>—</u>	<u>0.1530</u>	<u>—</u>	<u>0.1658</u>	<u>—</u>	<u>0.1802</u>
TOTALS	0	0.4002	0	0.4314	0	0.4737	0	0.5214

Total actual during four year period 0

Total expected during four year period 1.8267

## 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

Columbia Heights Fire Department Relief Association (Volunteer Division)

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

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

Columbia Heights Fire Department Relief Association (Volunteer Division)  
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, \$1,980 per year. For each year in excess of 20 an additional \$39.60 per year is added up to a maximum of \$2,376 per year for 30 or more years of service. Member may elect to receive an optional lump sum benefit of \$8,140 rather than monthly benefits.

Disability Retirement

Eligibility. Disabled to the extent that no longer able to perform services required of a firefighter before being eligible for age & service retirement. If duty related, there is no service requirement. If non-duty related, member must have at least 10 years of service to qualify.

Amount. (1) Duty Related. Same as regular retirement assuming a minimum of 20 years of service.

(2) Non-Duty Related. For 10 years of service, \$594 per year. For each year in excess of 10 an additional \$72.60 per year is added up to a maximum of \$1,320 per year. Non-duty benefit payments do not begin until member reaches age 50.

Death Benefits

Eligibility.

Spouse. Legally married to member while active and at least 3 years prior to death and residing with member at time of death.

Child. Younger than age 16 or, if full time student, younger than 18.

Amount. 1. If Death Occurs After 20 Years Service As Volunteer

Spouse. 40% of regular retirement benefit.

Child. \$99 per year per child with \$198 maximum per year.

Spouse and child benefits are not payable until such time as member would have reached age 50 had the member survived.

2. If Death Occurs Prior To Completion Of 20 Years Service But After 10 Years Service And Death Is Not Duty Related.

Spouse. Lump sum payment of \$1,320 for first 10 years service plus \$176 for each full year in excess of 10 but less than 16 plus \$220 for each full year in excess of 15.

Child (maximum of 2). Lump sum payment of \$165 for first 10 years service plus \$22 for each full year in excess of 10 but less than 16 plus \$27.50 for each full year in excess of 15.

3. If Death Is Duty Related.

Spouse and Child. Same as benefits under 1. except that (i) benefits are payable immediately and (ii) if member was younger than 50, benefits are based on 20 years service regardless of amount of actual service. At time member would have reached age 50 the benefit is recomputed to give credit for any actual service over 20 years.

In addition to the benefits listed, a lump sum payment of \$1,100 is paid to the surviving spouse or nearest living relative.

Vested Deferred

10 But Less Than 20 Years Service.

Lump sum payment of \$3,300 for first 10 years plus \$440 per year for each full year in excess of 10 but less than 16 plus \$550 for each full year in excess of 15. Payment is deferred to age 50 and termination of service must have resulted from circumstances beyond the member's control.

More Than 20 Years Service And Separated Before Age 50.

Benefit amount is same as age & service benefit and payment beginning is deferred to attainment of age 50.

Member Contributions. None.