

The Report of the  
GAIN/LOSS ANALYSIS OF FINANCIAL EXPERIENCE  
During calendar 1979 and 1980  
CITY OF COLUMBIA HEIGHTS  
FIRE RELIEF ASSOCIATION  
Columbia Heights, Minnesota

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GABRIEL, ROEDER, SMITH & COMPANY  
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2090 First National Building  
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Area 313: 961-3346

May 11, 1981

City of Columbia Heights  
Fire Relief Association  
Columbia Heights, Minnesota

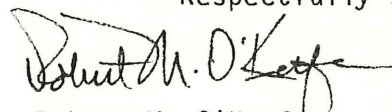
Submitted in this report are the results of the 1979-80 gain/loss analysis of the financial experiences of the City of Columbia Heights Fire Relief Association.

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

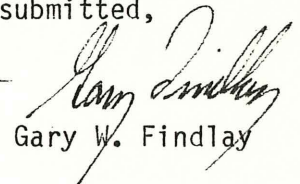
The gain/loss analysis was based upon statistical data furnished by the Association regarding active and retired member changes and related financial transactions.

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 casulaty 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 RELIEF ASSOCIATION

Schedule 1(A)

Gains & Losses in Accrued Liabilities  
and Changes in Contribution Requirements  
During Calendar 1979

| Type of Activity   | Accrued Liabilities<br>(Gain) or Loss |               | Contribution Requirements<br>(Gain) or Loss |               |
|--|---------------------------------------|---------------|---|---------------|
|  | Active                                | Retirants &   | Normal Cost                                 | \$ Payment    |
|  | Members                               | Beneficiaries | % of Payroll                                | on UAL        |
|  | (\$ in 1,000)                         |               | (\$ in 1,000)                               |               |
| <u>Age &amp; Service Retirements</u>   | \$ 98.7                               | \$ N/A        | N.C.*                                       | \$ 4.8        |
| <u>Disability &amp; Death-in-Service</u>   |                                       |               |   |               |
| a. <u>Disability</u>   | (2.1)                                 | N/A           | N.C.*                                       | (0.1)         |
| b. <u>Death-in Service</u>   | (11.0)                                | N/A           | N.C.*                                       | (0.5)         |
| <u>Withdrawal</u>  | 0.9                                   | N/A           | N.C.*                                       | 0.0           |
| <u>Salary Increases</u>  | 105.6                                 | 55.5          | N.C.*                                       | 7.9           |
| <u>Investment Income</u>   | (2.2)                                 | (10.0)        |   | (0.6)         |
| <u>Post Retirement Mortality</u>   | N/A                                   | 4.2           | N/A   | 0.2           |
| <u>Contribution</u>  | (0.1)                                 | 0             |   | 0.0           |
| <u>Miscellaneous</u>   | <u>(4.2)</u>                          | <u>(1.1)</u>  |   | <u>(0.3)</u>  |
| EXPERIENCE RELATED (GAIN)/LOSS<br>& CORRESPONDING CHANGE IN<br>CONTRIBUTION REQUIREMENTS | \$185.6                               | \$48.6        | N.C.*                                       | \$11.4        |
| <u>Changes due to plan amendments</u>  | <u>0</u>                              | <u>0</u>      |   | <u>0</u>      |
| TOTAL (GAIN)/LOSS DURING YEAR  | <u>\$185.6</u>                        | <u>\$48.6</u> | <u>N.C.*</u>                                | <u>\$11.4</u> |

\* Not Computed.

COLUMBIA HEIGHTS FIRE RELIEF ASSOCIATION

Schedule 1(B)

Gains & Losses in Accrued Liabilities  
and Changes in Contribution Requirements  
During Calendar 1980

| Type of Activity   | Accrued Liabilities<br>(Gain) or Loss |               | Contribution Requirements<br>(Gain) or Loss |               |
|--|---------------------------------------|---------------|---|---------------|
|  | Active                                | Retirants &   | Normal Cost                                 | \$ Payment    |
|  | Members                               | Beneficiaries | % of Payroll                                | on UAL        |
|  | (\$ in 1,000)                         |               | (\$ in 1,000)                               |               |
| <u>Age &amp; Service Retirements</u>   | \$ 0.0                                | \$ N/A        | (0.90)%                                     | \$ 0.0        |
| <u>Disability &amp; Death-in-Service</u>   |                                       |               |   |               |
| a. <u>Disability</u>   | (2.2)                                 | N/A           | (0.77)                                      | (0.1)         |
| b. <u>Death-in Service</u>   | (10.2)                                | N/A           | (0.06)                                      | (0.5)         |
| <u>Withdrawal</u>  | 1.2                                   | N/A           | 0.36  | 0.1           |
| <u>Salary Increases</u>  | 51.9                                  | 37.7          | 0.00  | 4.4           |
| <u>Investment Income</u>   | (2.7)                                 | (12.9)        | 0.00  | (0.8)         |
| <u>Post Retirement Mortality</u>   | N/A                                   | 4.9           | N/A   | 0.2           |
| <u>Contributions</u>   | 0.6                                   | 0.0           | N/A   | *             |
| <u>Miscellaneous</u>   | <u>1.8</u>                            | <u>1.4</u>    | <u>      </u>                               | <u>0.2</u>    |
| EXPERIENCE RELATED (GAIN)/LOSS<br>& CORRESPONDING CHANGE IN<br>CONTRIBUTION REQUIREMENTS | \$40.4                                | \$31.1        | (1.37)%                                     | \$ 3.5        |
| <u>Conversion to UAL Amortization</u>  |                                       |               | N/A   | 17.3          |
| <u>Change in Funding Method For<br/>Death &amp; Disability</u>                           | 30.8                                  | N/A           | (0.84)                                      | 1.5           |
| <u>Changes due to plan amendments</u>  | <u>11.9</u>                           | <u>0.0</u>    | <u>0.35</u>                                 | <u>0.6</u>    |
| TOTAL (GAIN)/LOSS DURING YEAR  | <u>\$83.1</u>                         | <u>\$31.1</u> | <u>(1.86)%</u>                              | <u>\$22.9</u> |

COLUMBIA HEIGHTS FIRE RELIEF ASSOCIATION

Schedule 2(A)

Employees Active at Both Beginning & End of 1979

| <u>Age<br/>Group<br/>Beg. Year</u> | <u>No.</u> | <u>Beginning<br/>Salary</u> | <u>Ending<br/>Salary</u> | <u>% Increase<br/>In Salary</u> |
|------------------------------------|------------|-----------------------------|--------------------------|---------------------------------|
| 35-39                              | 1          | \$ 17,076                   | \$ 19,920                | 16.7%                           |
| 45-49                              | 3          | 51,228                      | 59,760                   | 16.7                            |
| 50-54                              | 1          | 17,076                      | 19,920                   | 16.7                            |
| 55-59                              | <u>1</u>   | <u>17,076</u>               | <u>19,920</u>            | 16.7                            |
| TOTALS                             | 6          | \$102,456                   | \$119,520                | 16.7%                           |

Employees Active at Either Beginning or End of 1979

| <u>Years<br/>Service</u> | <u>Beginning<br/>of Year</u> | <u>End<br/>of Year</u> |
|--------------------------|------------------------------|------------------------|
| 0                        | 0                            | 0                      |
| 1                        | 0                            | 0                      |
| 2                        | 0                            | 0                      |
| 3                        | 0                            | 0                      |
| 4                        | 0                            | 0                      |
| 5 or more                | 7                            | 6                      |

Average Age: 48.7 years.

Average Service: 19.4 years.



COLUMBIA HEIGHTS FIRE RELIEF ASSOCIATION

Schedule 2(B)

Employees Active at Both Beginning & End of 1980

| <u>Age<br/>Group<br/>Beg. Year</u> | <u>No.</u> | <u>Beginning<br/>Salary</u> | <u>Ending<br/>Salary</u> | <u>% Increase<br/>In Salary</u> |
|------------------------------------|------------|-----------------------------|--------------------------|---------------------------------|
| 35-39                              | 1          | \$ 19,920                   | \$ 21,712                | 9.0%                            |
| 45-49                              | 3          | 59,760                      | 65,136                   | 9.0                             |
| 55-59                              | <u>2</u>   | <u>39,840</u>               | <u>43,424</u>            | 9.0                             |
| TOTALS                             | 6          | \$119,520                   | \$130,272                | 9.0%                            |

Employees Active at Either Beginning or End of 1980

| <u>Years<br/>Service</u> | <u>Beginning<br/>of Year</u> | <u>End<br/>of Year</u> |
|--------------------------|------------------------------|------------------------|
| 0                        | 0                            | 0                      |
| 1                        | 0                            | 0                      |
| 2                        | 0                            | 0                      |
| 3                        | 0                            | 0                      |
| 4                        | 0                            | 0                      |
| 5 or more                | 6                            | 6                      |

Average Age: 49.7 years.

Average Service: 20.4 years.

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COLUMBIA HEIGHTS FIRE RELIEF ASSOCIATION

Schedule 3(A)

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

| <u>Age at<br/>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> |
| 45-49                         |                   |                 |                   |                 |               | 0.1             |
| 50-54                         | —                 | —               | —                 | —               | —             | *               |
| TOTALS                        | 0                 | 0.0             | 0                 | 0.0             | 0             | 0.1             |

\* Less than 0.1%

| <u>Years<br/>Service at<br/>Termination</u> | <u>Actual</u> | <u>Expected</u> |
|---|---------------|-----------------|
| 0   |               |                 |
| 1   |               |                 |
| 2   |               |                 |
| 3   |               |                 |
| 4   |               |                 |
| 5 of more                                   | —             | —               |
| TOTALS                                      | 0             | 0.0             |

Average age at separation: N/A.

Average service at separation: N/A.

COLUMBIA HEIGHTS FIRE RELIEF ASSOCIATION

Schedule 3(B)

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

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| <u>Age at<br/>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> |
| 45-49                         | —                 | —               | —                 | —               | —             | 0.1             |
| TOTALS                        | 0                 | 0.0             | 0                 | 0.0             | 0             | 0.1             |

\* Less than 0.1%

| <u>Years<br/>Service at<br/>Termination</u> | <u>Actual</u> | <u>Expected</u> |
|---|---------------|-----------------|
| 0   |               |                 |
| 1   |               |                 |
| 2   |               |                 |
| 3   |               |                 |
| 4   |               |                 |
| 5 of more                                   | —             | —               |
| TOTALS                                      | 0             | 0.0             |

Average age at separation: N/A.

Average service at separation: N/A.

COLUMBIA HEIGHTS FIRE RELIEF ASSOCIATION

Schedule 4

Separations From Active Service  
For Age & Service Retirement

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| <u>Age at<br/>Termination</u> | <u>1979</u>   |                 | <u>1980</u>   |                 |
|-------------------------------|---------------|-----------------|---------------|-----------------|
|                               | <u>Actual</u> | <u>Expected</u> | <u>Actual</u> | <u>Expected</u> |
| 51                            | <u>1</u>      | <u>—</u>        | <u>—</u>      | <u>—</u>        |
| TOTALS                        | 1             | 0.0             | 0             | 0.0             |

Average age at retirement during period examined: 51.0 years.

Average service at retirement during period examined: 20.0 years.



COLUMBIA HEIGHTS FIRE RELIEF ASSOCIATION

Schedule 5

Death After Retirement  
(Disability and Service Retirants)

| <u>Age at<br/>Death</u> | <u>1979</u>   |                 | <u>1980</u>   |                 |
|-------------------------|---------------|-----------------|---------------|-----------------|
|                         | <u>Actual</u> | <u>Expected</u> | <u>Actual</u> | <u>Expected</u> |
| 50-54                   |               | 0.0101          |               | 0.0212          |
| 65-69                   | —             | <u>0.0787</u>   | —             | <u>0.0846</u>   |
| TOTALS                  | 0             | 0.0888          | 0             | 0.1058          |

Average age at death: N/A.

### Comments

The increase in the normal cost rate shown in 1980 represents the change over the 1978 results.

The decrease in the rate is a result of a lower average attained age, at date of hire, for the remaining active participants.

## APPENDICES

# COLUMBIA HEIGHTS FIRE 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<br>Ages | Single Life Values:<br>Present Value of \$1 Monthly |          |                           |          | Future Life<br>Expectancy (Years) |       |
|----------------|---|----------|---------------------------|----------|-----------------------------------|-------|
|                | Level<br>For Life                                   |          | Increasing<br>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<br>Ages | % of Active Members<br>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<br/>Ages</u> | <u>Present Pay<br/>Resulting in<br/>Pay of \$1,000 at Age 60</u> | <u>Percent Increase<br/>in Pay<br/>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<br/>Ages</u> | <u>% of Active Members Becoming<br/>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 (Paid Division)

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, 35/80 of base pay. For each year in excess of 20 an additional 1/80 is added up to a maximum of 45/80 of base pay for 30 or more years of service. In addition, and not subject to the above maximum, for each year over 25, a benefit of 1/2% of base pay is added to the benefit. (The additional benefit is not subject to the post retirement adjustment provisions.)

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

Disability Retirement.

Eligibility. Disabled to the extent that no longer able to perform the duties of a fireman before being eligible for age & service retirement.

Amount.

- (1) Less than 10 years service - 30/80 of base pay.
- (2) 10 to 15 years service - 35/80 of base pay.
- (3) 15 or more years service - 40/80 of base pay to age 50 at which time the benefit is recomputed based on service assuming a minimum of 20 years of service.

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

Eligibility.

Spouse. Legally married to member at least 3 years before separation from service and residing with member at time of death. Benefits terminate upon remarriage.

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

Amount.

Spouse. 32/80 of base pay.

Child. 4/80 of base pay per child. Children's maximum is 8/80 of base pay if spouse is receiving or 12/80 of base pay 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 simultaneously changed by the same percent that base pay is changed.

Member Contributions. 8% of base pay. Total member contributions are refundable, without interest, upon separation from service if no monthly benefit is payable.