

**PLYMOUTH FIREFIGHTERS
RELIEF ASSOCIATION**

**Actuarial Valuation
and Benefit Study
as of January 1, 1989**

September 5, 1989

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**PLYMOUTH FIREFIGHTERS RELIEF ASSOCIATION
ACTUARIAL VALUATION AND BENEFIT STUDY
AS OF JANUARY 1, 1989**

PURPOSE AND SUMMARY

The following report sets forth the results of our study for the Plymouth Firefighters Relief Association. The study included the following:

- Determination of annual contribution for the current plan - \$119,464.
- Determination of annual contribution for a \$1 benefit increase - \$6,488.

The results of our study are summarized in the tables of the report and discussed further herein. The annual contribution for the current plan is just slightly below the 1988 state aid of \$120,597.

EMPLOYEE DATA

Based on data provided by the Association, there are 59 active members included in the valuation. The members have an average attained age of 31.5 and an average entry age of 25.5. Table 3(a) sets forth the prospective benefit each member may expect to receive if he remains in the Association until the normal retirement date assumed in the valuation, age 50 and completion of 20 years of service.

There are 14 inactive members entitled to benefits under the plan. Eleven retired members who are currently receiving monthly benefits, two members who are entitled to future payments upon attainment of age 50, and D. Welch who retired as of January 1, 1989 and was due a lump sum of \$48,000. Table 3(b) is a summary of the benefits for these members.

ASSETS

Mr. David Leuer provided us with a statement of the value of the Special Fund prepared by the Association's accountant as of January 1, 1989. Assets are valued at \$1,073,276 on such date on a market value basis. We have used this value for valuation purposes.

PLAN PROVISIONS AND ACTUARIAL ASSUMPTIONS

Table 4 is a summary of the principal plan provisions of the current plan. The plan was amended effective February 1, 1988. The amendment changed the monthly benefit level from \$15.00 to \$24.00 and the optional lump sum payment from \$1,500 to \$2,400, per year of service.

Table 5 sets forth a summary of the actuarial assumptions used in valuing these plan provisions. We have used the same assumptions as used for the last valuation of the plan. We certify that this Actuarial Valuation and Benefit Study has been prepared in accordance with Chapters 356.20 to 356.23 of the Minnesota State Statutes as they apply to volunteer relief associations defined in Chapter 69.771.

As required by law, the funding method used for the valuation is the entry age normal cost method. Under this method, the normal cost is computed as that level amount which would fund all benefits if it was contributed every year from each fireman's entry into the plan until his retirement. The total normal cost for the plan is the sum of the normal costs for all active members.

The present value of all future benefits payable from the plan for all active and inactive members less the present value of all future normal costs is defined as the accrued liability. The accrued liability is the amount that would have accumulated in the Special Fund if all the actuarial assumptions had been exactly realized in all prior years and if funding for all members, based on current plan benefits, had commenced immediately upon their date of joining the Association.

The accrued liability then is compared to the value of the Special Fund. Any excess of accrued liability over asset value, known as the unfunded accrued liability, is to be funded with a payment to be made annually for a number of years specified by law, known as the amortization payment. The current unfunded accrued liability must be funded over 18 years. Increases in the unfunded accrued liability due to changes in the benefits or actuarial assumptions must be amortized over 20 years.

The amortization payment is added to the normal cost for the total annual contribution due as of the valuation date. Interest must be added to the contribution at the rate of 5% from the valuation date to the date of payment. Thus, if payment were

made as of December 31, 1989, the January 1 contribution amount would be multiplied by 1.05.

SUMMARY OF VALUATION RESULTS

Table 1(a) sets forth a summary of the results of the valuation of the current plan. As shown in item 7, the total cost of the plan is \$119,464 as of December 31, 1989.

The contribution is higher than the contribution from our January 1, 1986 valuation which reported a contribution requirement of approximately \$108,641 (60,194 + (9*5,383)) for a \$24.00 per year of service plan. The contribution is up slightly due mainly to asset performance lower than that assumed in the valuation and an 11% increase in the number of active members.

CHANGE IN THE UNFUNDED ACCRUED LIABILITY

Chapter 356 requires a reconciliation of the unfunded accrued liability from one valuation to the next valuation. Our last valuation as of January 1, 1986 reported an unfunded accrued liability of \$80,345.

As of January 1, 1989, there is an unfunded accrued liability of \$382,663. The change of \$302,288 is a result of the following:

1.	January 1, 1986 Unfunded Accrued Liability	\$ 80,345
2.	Decrease due to:	
a.	Contributions 1986-1988	126,848
3.	Increase due to:	
a.	Change from \$15.00 to \$24.00 monthly benefit level	322,761
b.	Increase due to Asset Loss	55,303
c.	Increase due to Misc. Loss	51,072
c.	Total Increase	429,136
4.	January 1, 1989 Unfunded Accrued Liability (1. - 2.c + 3.b)	\$ 382,633

For valuation purposes a 5 percent annual yield on assets is assumed. ~~The Special Fund annual yield over the three year period since the last valuation was performed was approximately 3%.~~ The asset loss was due largely to the loss that the

Special Fund took in 1987. The miscellaneous loss of \$51,072 over the period is from experience under the plan (mortality, turnover and disability) slightly less favorable than that assumed.

BENEFIT STUDY RESULTS

Table 1(b) summarizes the results of our benefit study for the Association. Table 1(b) assumes the current basic plan provisions remain intact and the monthly benefit level is increased. The first column of the table sets forth the annual contribution for the current plan. The second column of the table sets forth the determination of the annual contribution necessary to fund an additional monthly benefit of \$1 per year of service for active members. The annual contribution for this additional benefit is \$6,488 as of December 31, 1989. To determine the total new plan cost, one determines the cost of the increased benefit and adds the cost of the current plan.

The last two columns set forth examples of this calculation. If benefits were increased to \$25.00 per year of service, the cost of a \$1 increase is added to the cost in column 1 to determine the total required contribution as set forth in column 3. Using column 1 and multiples of column 2, one may determine the required contributions for any benefit level under the plan. The cost of a \$26.00 plan is column 1 plus 2.0 times column 2.

You requested that we look into the effect of raising the lump sum option from \$2,400 to \$3,000 per year of service. The \$24 monthly benefit level of your current plan is equal in value to a lump sum of \$3,650, much more than the current \$2,400 option. For funding purposes we assume the member always chooses the most valuable option - the monthly option. Any time a member elects the lump sum there is a gain to the plan which then reduces the required contribution in the next valuation.

Thus if you raised the lump sum option to \$3,000, the monthly benefit of \$24 would still be the more valuable option under the plan. The funding requirements would not change. They would be identical to those set forth in Tables 1(a) and 1(b).

In the final determination of what benefits are to be provided by the plan, the Association must be sure that the projected income from the state aid and the city contributions equal or exceeds the contribution requirements set forth in this report.


FINANCIAL DISCLOSURE

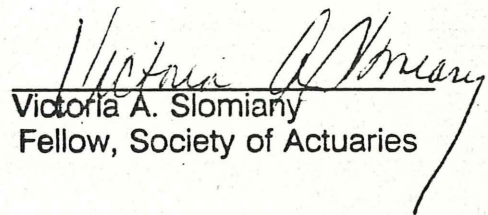
Table 2 sets forth the information required by Government Accounting Standards Board Statement 5 for disclosure in the city's financial statements. The values represent the current value of the benefits earned to date under the plan. Plan assets are slightly below this value.

If in connection with this study any additional work is required, we will be happy to proceed as directed.

Respectfully submitted,

THE WYATT COMPANY


Richard Holtz
Associate, Society of Actuaries


Victoria A. Slomiany
Fellow, Society of Actuaries

Minneapolis/St. Paul
September 5, 1989

Table 1(a)

PLYMOUTH FIREFIGHTERS RELIEF ASSOCIATION

Results of Actuarial Valuation of Current Plan
as of January 1, 1989

1.	Accrued Liability	
a.	Active Members	924,866
b.	Retired Members	503,940
c.	Terminated Members Entitled to Deferred Benefits	27,103
d.	Total	1,455,909
2.	Valuation Assets	1,073,276
3.	Unfunded Accrued Liability (1 - 2)	382,633
4.	Amortization Payment for Unfunded Accrued Liability	31,174
5.	Annual Normal Cost	82,601
6.	Annual Contribution Payable as of January 1, 1989 (4+5)	113,775
7.	Annual Contribution Payable as of December 31, 1989 (6 * 1.05)	119,464

Table 1(b)

PLYMOUTH FIREFIGHTERS RELIEF ASSOCIATION

Annual Contribution for \$1 Monthly Benefit Increase

	Current Plan \$24.00 benefit	Additional \$1 Benefit	Example: \$25.00 Benefit <u>1</u> /	Example: \$26.00 Benefit <u>1</u> /
1. Accrued Liability				
a. Active Members	924,866	38,383	963,249	1,001,632
b. Retired Members	503,940	0	503,940	503,940
c. Terminated Members Entitled to Deferred Benefits	27,103	0	27,103	27,103
d. Total	1,455,909	38,383	1,494,292	1,532,675
2. Valuation Assets	1,073,276	0	1,073,276	1,073,276
3. Unfunded Accrued Liability (1 - 2)	382,633	38,383	421,016	459,399
4. Amortization Payment for Unfunded Accrued Liability	31,174	2,933	34,107	37,040
5. Annual Normal Cost	82,601	3,246	85,847	89,093
6. Annual Contribution Payable as of January 1, 1989 (4+5)	113,775	6,179	119,954	126,133
7. Annual Contribution Payable as of December 31, 1989 (6 * 1.05)	119,464	6,488	125,952	132,440

1/ These are examples of determination of contribution for increased benefits.
New costs equal column 1 plus amount of benefit increase times column 2.

Table 2

**PLYMOUTH FIREFIGHTERS
RELIEF ASSOCIATION**

**Financial Disclosure Information
as of January 1, 1989¹**

Pension Benefit Obligation

Retirees and beneficiaries currently receiving benefits and terminated members not yet receiving benefits	531,043
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Current members -

Accumulated member contributions including allocated investment earnings	0
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Vested benefits	392,303
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Nonvested benefits	229,464
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Total Pension Benefit Obligation	1,152,810
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¹Assumes future rate of return on plan assets of 5%.

Table 3(a)

PLYMOUTH FIREFIGHTERS
RELIEF ASSOCIATION

Projected Benefits for Active Members as of January 1, 1989 1/

<u>Name</u>	<u>Birth Date</u>	<u>Entry Date</u>	<u>Projected Annual Benefit</u>
H AHRENS	8/56	12/88	5,760.00
P ANDERSON	7/58	7/85	6,624.00
T ARBOGAST	5/55	7/86	5,760.00
K BEGIN	8/61	1/84	7,776.00
R BEGIN	1/28	9/65	6,624.00
K BOHLMAN	12/56	7/85	6,048.00
H BRANYON	8/60	12/88	6,336.00
P BRANYON	7/50	7/85	5,760.00
T BRENNAN	11/57	7/85	6,336.00
T BUCKLEY	6/38	10/79	5,760.00
D BURKE	1/57	7/85	6,048.00
S CARTER	9/58	12/88	5,760.00
J DAHLSTROM	4/61	7/86	6,912.00
D ELLIOTT	9/58	4/80	8,064.00
S ELLIOTT	4/66	7/85	8,640.00
T ELLIOTT	1/68	4/87	8,640.00
D EVENSON	9/48	2/71	7,776.00
T EVENSON	3/69	1/87	8,640.00
B FASCHING	3/67	1/87	8,352.00
D FOLEY	11/59	7/86	6,624.00
J FOURNIER	1/54	5/78	7,200.00
S FRANKS	1/67	7/86	8,640.00
S GANJE	5/57	6/87	5,760.00
L GRATZ	3/59	4/87	6,048.00
B HEBERT	5/67	7/85	8,640.00
D HEBERT	4/66	7/85	8,640.00
W HEBERT	4/65	3/85	8,352.00
S HUBERTY	12/62	8/87	7,200.00
D JACH	4/64	7/85	8,064.00
M JAMINSKI	6/58	7/85	6,336.00
B JOHNSON	1/53	5/76	7,488.00
D JULSETH	11/54	8/83	6,048.00
W KUSS	4/64	6/83	8,640.00
T LAHTI	3/56	12/81	6,912.00

1/ Assumes retirement upon attainment of age 50 and completion of 20 years of service.

Table 3(a)

PLYMOUTH FIREFIGHTERS
RELIEF ASSOCIATION

Projected Benefits for Active Members as of January 1, 1989 1/

<u>Name</u>	<u>Birth Date</u>	<u>Entry Date</u>	<u>Projected Annual Benefit</u>
D LEUER	6/50	7/78	6,048.00
G LEUER	6/59	6/78	8,640.00
K LEUER	3/63	8/81	8,640.00
C LINDBERGER	5/65	6/83	8,640.00
R LUTH	9/52	4/76	7,488.00
R LYMER	10/41	11/73	5,760.00
J MARTIN	4/59	12/80	8,064.00
M MEYER	3/70	1/89	8,640.00
J NELSON	4/47	7/86	5,760.00
J NOLTING	4/45	1/69	7,200.00
L PHILLIPPE	4/54	1/75	8,064.00
L PLACK	12/55	5/79	7,488.00
D RICKER	4/61	9/88	6,336.00
C SCHARLAU	11/36	5/78	5,760.00
T SCHARLAU	9/64	6/83	8,640.00
T SCHRODEN	5/53	7/85	5,760.00
S SCOFIELD	3/48	4/80	5,760.00
R SHELDON	10/62	1/83	8,352.00
J SISK	6/67	7/86	8,640.00
C SMITH	9/66	7/85	8,640.00
W STARR	1/57	7/85	6,048.00
W TOMBERS	3/54	5/76	7,776.00
M TOMCZYK	2/57	11/76	6,912.00
C VEFLIN	1/36	11/72	5,760.00
S WIMMERGREN	8/67	7/86	8,640.00

1/ Assumes retirement upon attainment of age 50 and completion of 20 years of service.

Table 3(b)

PLYMOUTH FIREFIGHTERS
RELIEF ASSOCIATION

Benefits for Inactive Members as of January 1, 1989

<u>Name</u>	<u>Type</u>	<u>Monthly Benefit</u>
J ARBEITER	RETIRED	359.04
D AUDETTE	RETIRED	300.00
F BAUER	RETIRED	170.00
A FRANEY	RETIRED	315.00
A LEE	RETIRED	345.00
A REINKE	RETIRED	300.00
C ROSELAND	RETIRED	300.00
A SCHIEBE	RETIRED	300.00
H SCHIEBE	RETIRED	300.00
J SCHWENDEMA	RETIRED	170.00
B TOUHEY	RETIRED	330.00
G KIVLEY	DEFERRED	80.96
J HELMAN	DEFERRED	105.60
D WELCH	LUMP SUM	48,000.00

Table 4

**PLYMOUTH FIREFIGHTERS
RELIEF ASSOCIATION**

Summary of Current Plan Provisions

- | | | |
|----|-----------------------------|--|
| 1. | Normal Retirement Benefit: | Monthly benefit of \$24.00 per month per completed year of service payable on retirement after attainment of age 50 and completion of 20 years of service. No credit granted for more than 30 years of service. |
| 2. | Deferred Vested Benefit: | On termination after completion of 10 years of service, a deferred benefit is payable at age 50. The benefit is equal to the accrued normal retirement benefit multiplied by the vesting percentage. The vesting percentage is 60% after 10 years plus 4% per year in excess of 10 to a maximum of 100% after 20 years. |
| 3. | Disability Benefit: | A monthly benefit of \$170 is payable to any active member who is temporarily disabled in the line of duty. Benefit is payable throughout the disability (minimum 10 days, maximum 52 weeks). Upon total and permanent disability in the line of duty a member with 10 or more years of service is entitled to a lump sum benefit based upon years of service multiplied by a reduction factor based upon the member's age at time of disability as set forth in the Association's bylaws. |
| 4. | Lump Sum Death Benefit: | \$2,500 payable on death of any active member. \$1,000 payable on death on death of an inactive member. |
| 5. | Surviving Spouse's Benefit: | On death of any inactive member or active member with 10 or more years of service, 50% of the member's vested accrued benefit would be payable immediately to the surviving spouse. |

6. **Surviving Children's Benefit:**

On death of any inactive member or active member with 10 or more years of service, 25% of the member's vested accrued benefit would be payable immediately to the surviving children until attainment of age 18.

Table 5

**PLYMOUTH FIREFIGHTERS
RELIEF ASSOCIATION**

Actuarial Assumptions and Method

- | | | |
|----|------------------------|--|
| 1. | Mortality: | The 1971 Group Annuity Mortality Table, without margins, projected to 1976 by Scale E. This table used for all rates of mortality. |
| 2. | Withdrawal: | The rate of withdrawal is .070 for ages 20-30, decreasing uniformly thereafter to zero at age 45 with no withdrawal after that age. |
| 3. | Disability: | The 1947-49 Weekly Indemnity Tabular Annual Claims Cost was used for valuing the short term disability on a one year term cost basis. The Railroad Retirement Board 12th Valuation rates of disablement were used for valuing the lump sum disability benefit on a full funding basis. Both tables were loaded for the size and nature of the group. |
| 4. | Retirement Age: | Members are assumed to retire after attaining age 50 and completing 20 years of service. |
| 5. | Interest Rate: | Five percent compounded annually. |
| 6. | Actuarial Cost Method: | The entry age normal cost method has been used with the normal cost determined as a level amount each year from the date of joining the Association to the assumed retirement age. |