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ACTUARIAL VALUATION REPORT
OF THE
MINNESOTA HIGHWAY PATROL OFFICERS'
RETIREMENT ASSOCIATION
AS OF
JUNE 30, 1978

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INTRODUCTION

Minnesota Highway Patrol Officers' Retirement Association

In accordance with the pertinent chapters of Minnesota Laws, an actuarial valuation as of June 30, 1978, has been made of this Retirement Association. The valuation covers the membership of the fund as shown in the census of members and survivors of deceased members, which is included in this report. The details of the benefits under the Plan, assets in the fund, income of the fund, and membership data were furnished by the Administrator of this Plan.

The report covers the following items:

- A. Benefits of the Plan and Contributions
- B. Assumptions in Actuarial Valuation
- C. Results of Valuation
- D. Discussion of Results
- E. Analysis of Change in the Unfunded Accrued Liability
- F. Census of Membership and Benefits as of June 30, 1978
- G. Analysis of Changes in Membership
- H. Average Ages at Entry and Retirement
- I. Certification by Actuary

MINNESOTA HIGHWAY PATROL OFFICERS' RETIREMENT FUND

A. BENEFITS OF PLAN AND CONTRIBUTIONS

This Plan provides the following major benefits:

1. Retirement Benefit

a. Requirements for retirement:

- (1) Age 55 and ten years of service required for full service benefit.
- (2) Ten years of service required for vesting of deferred annuity benefit with payments to start at age 55.

b. Monthly Annuity:

2½% of average monthly salary for each year up to and including 20 years; 2% for each year of service in excess of 20.

c. Average Monthly Salary:

Average of highest five years.

2. Disability Benefit

a. Requirements:

In Line of Duty: None.

Not in Line of Duty: Five years of service and age less than 55.

b. Monthly Annuity:

In Line of Duty: 50% of average monthly salary plus 2% for each year of service in excess of 20.

Not in Line of Duty: 2½% of average monthly salary for each year up to and including 20 years plus 2% for each year in excess of 20; a minimum of 25%.

3. Widow's and Orphan's Benefits

a. Active Members:

(1) Death benefit before retirement:

Widow:	20% of average covered monthly salary.
Orphans:	10% of average covered monthly salary to age 18 or 22 for each child plus \$20 per month prorated equally to such children.

(Maximum total orphan benefit 40% of average monthly salary.)

(2) Death benefit after retirement:

None (actuarial equivalent of life annuity may be chosen under an option to provide a widow's benefit). However, the widows of those members who retired or separated from the fund with vested benefits prior to July 1, 1965 will receive \$156.25 per month plus increases authorized in 1976, 1977, and 1978.

b. Retired Members: None

c. Disabled Members: 20% of average covered salary to widow if person was receiving a work related disability benefit, or if person was receiving a non-work related disability benefit and had at least 20 years of service.

4. Other Death Benefit

(Lump Sum): None

5. Termination of Employment Benefit

Refund of Participant's contributions without interest may be applied for upon termination with less than 20 years of service. If refund is not applied for and Participant has completed ten years of service, a vested deferred annuity may be payable commencing at age 55.

6. Contributions

Members:	7.0% of salary
Employer Regular:	12.0% of salary
Employer Additional:	<u>9.0%</u> of salary
Total	28.0% of salary

B. ASSUMPTIONS IN ACTUARIAL VALUATION

1. Mortality: United States Life Tables, 1959-61 (White Males and White Females). These tables were used for both active and retired members, and for survivors.
2. Disability: The rates of disability were adapted from experience of the New York State Employees' Retirement System, graduated and extrapolated as required for this valuation.
3. Withdrawal: A rate of withdrawal of .030 at age 20 decreasing uniformly to zero at age 50 with no withdrawals after that age.
4. Salary Scale: Salaries were assumed to increase $3\frac{1}{2}\%$ each year.
5. Retirement Age: The assumed average ages at retirement for this fund were 57.0 for the Highway Patrol group and for the State Police Officers group hired after 6-30-61, and 62.5 for the State Police Officers group hired before 7-1-61.
6. Interest: 5%, compounded annually.

It is felt that these assumptions are appropriate for the valuation of this fund on a realistic basis.

C. RESULTS OF VALUATION

1. Valuation

Normal Cost of Benefits	\$ 1,954,840
Administrative Expense	34,438
Accrued Liability	59,643,395

2. Current Deficit from Full Funding

Accrued Liability	\$ 59,643,395
Assets in Fund*	37,265,557
Unfunded Accrued Liability	\$ 22,377,838

3. Annual Payment to Achieve Full Funding by 1997

Annual Deposit to Retire Deficit by 1997	\$ 1,763,480
Total Normal Cost	1,954,840
Administrative Cost	34,438
Total Annual Payment	\$ 3,752,758

4. Minimum Contribution to Prevent Increase in Deficit

Interest on Deficit at 5%	\$ 1,118,892
Total Normal Cost	1,954,840
Administrative Expense	34,438
Minimum Contribution	\$ 3,108,170

5. Income of Fund during Fiscal Year Ending June 30, 1978*

Members' Contributions	\$ 1,203,801
Taxes or Public Funds	3,306,684
Total Contributions	\$ 4,510,485
Investment Income (excluding Adjustable Fund)	1,452,075

6. Annual Payroll*

Total Projected Payroll, 1978-1979	\$ 13,771,848
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*Data furnished by Administrator. For valuation purposes, assets from Minnesota Adjustable Fixed Benefit Fund taken equal to reserves for benefits payable from this Fund.

D. DISCUSSION OF RESULTS

The valuation was made by a method known as the entry age normal cost method. Under this method, the normal cost is determined based on the age at hire of each member. This normal cost is the annual deposit required (using the assumptions outlined in Section B above) to pay for the cost of each member's prospective benefits over a period from his date of hire to his date of retirement. This normal cost is determined as a level percentage of payroll; therefore, future increases in payroll will produce increases in the number of dollars of normal cost.

The elements of normal cost for this Plan are:

<u>Type of Benefit</u>	<u>Normal Cost</u>
Service Retirement Benefit	\$ 1,254,417
Disability Benefit	369,017
Withdrawal Benefit	4,841
Survivor's Benefit	233,295
Vesting	93,270
Total Normal Cost	\$ 1,954,840

This total normal cost and the administrative expense equal 14.44% of the total payroll as of June 30, 1978.

When a retirement plan is fully funded, the fund contains an amount equal to the accumulation (under the actuarial assumptions made) of the normal cost for each member from his date of hire to the date of the valuation. This accumulation is called the accrued liability or the required reserve.

The elements of accrued liability for this Plan are:

	<u>Type of Benefit</u>	<u>Accrued Liability</u>
1.	<u>Active Members</u>	
	Retirement Benefit	\$39,360,816
	Disability Benefit	3,035,523
	Withdrawal Benefit	31,533
	Survivor's Benefit	2,445,064
	Vesting	1,292,013
	Total for Active Members	\$46,164,949
2.	<u>Inactive Members</u>	
	Retired	\$ 8,679,661
	Disabled	604,271
	Deferred Retired	850,663
	Widows	1,946,229
	Orphans	213,061
	Survivor's Benefit	1,175,458
	Nonvested Refunds Due and Leave of Absence	9,103
	Total for Inactive Members	\$13,478,446
	Total Accrued Liability	\$59,643,395

A retirement plan which is fully funded requires future contributions no larger than the sum of the administrative expense and the normal costs for all active members to pay for the prospective benefits (if the assumptions made are realized exactly). To the extent that normal costs and administrative expenses have not been paid in the past, a plan is not fully funded. The amount by which the plan is short of full funding is called the unfunded accrued liability of the fund. In other words, the unfunded accrued liability is the excess of the accrued liability over the actual assets of the fund.

The amount of annual contribution which would be required to pay each year's normal cost, to pay the administrative expense and to eliminate the deficit by 1997 is the "total annual payment" shown in Section C of this report.

The deficit in the fund will increase unless at least 5% interest on the deficit is paid each year in addition to the normal cost and the administrative expenses. The sum of these three amounts should be regarded as the minimum annual contribution to the fund in order to keep the deficit at its present size. This "minimum contribution" is shown in Section C of this report.

E. ANALYSIS OF CHANGE IN THE UNFUNDED ACCRUED LIABILITY

As of 6-30-77

Accrued Liability	\$54,026,436	
Assets	<u>32,177,068</u>	
Unfunded Accrued Liability		\$21,849,368

As of 6-30-78

Accrued Liability	\$59,643,395	
Assets	<u>37,265,557</u>	
Unfunded Accrued Liability		<u>\$22,377,838</u>

Increase in Unfunded Accrued Liability \$ 528,470

Increases:

Salary Scale Loss	\$ 1,804,661	
Mortality and Termination Loss	492,348	
Mortality Loss - MAFBF	134,124	
Depreciation	<u>54,392</u>	
Total Increases		\$ 2,485,525

Decreases:

Capital Gain	\$ 7,708	
Excess Interest	362,969	
Amortization Contribution	<u>1,586,378</u>	
Total Decreases		<u>\$ 1,957,055</u>

Net Increase \$ 528,470

F. CENSUS OF MEMBERSHIP AND BENEFITS AS OF JUNE 30, 1978

<u>Status</u>	<u>Number</u>	<u>Annual Payroll or Benefits</u>
Active Members	751	\$ 13,771,848
<u>Status</u>		
Service Retirements	165*	\$ 996,306
Disability Retirements	8	48,240
Widow Annuitants	79	207,627
Orphan Annuitants	35	37,710
<u>Status</u>		
Deferred Annuitants	19	\$ 116,889

*Includes 2 disabled participants receiving benefits.

G. ANALYSIS OF CHANGES IN MEMBERSHIP

Active Members

Number as of 6-30-77	756
New Entrants	<u>32</u>
Total	788
Leave of Absence	1
Deaths	3
Withdrawals with Vested Benefits	4
Withdrawals without Vested Benefits	13
Retired	14
Disabled	<u>2</u>
Total Terminations	<u>-37</u>
Number as of 6-30-78	751

Service Retirements

Number as of 6-30-77	154
Newly Retired	14
Transfer from Deferred Status	1
Transfer from Disabled Status	<u>2</u>
Total	171
Deaths	<u>- 6</u>
Number as of 6-30-78	165

Disabled Annuitants

Number as of 6-30-77	8
Newly Disabled	<u>2</u>
Total	10
Transfer to Retired Status	<u>- 2</u>
Number as of 6-30-78	8

Widow Annuitants

Number as of 6-30-77	76
Newly Widowed Active	3
Newly Widowed Retired	<u>5</u>

Total	84
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Deaths	2
Remarried	<u>3</u>

Total Terminations	<u>-5</u>
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Number as of 6-30-78	79
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Orphan Annuitants

Number as of 6-30-77	30
Newly Orphaned	6
Reinstated	<u>2</u>

Total	38
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Orphans Attaining Maximum Age or Not in School	<u>-3</u>
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Number as of 6-30-78	35
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Deferred Annuitants

Number as of 6-30-77	17
New Deferred Annuitants	<u>4</u>

Total	21
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Refundment	1
Transfer to Retired Status	1
Transfer to Active Status	0
Deaths	0
Transfer to Widow Status	<u>0</u>

Total Terminations	<u>-2</u>
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Number as of 6-30-78	19
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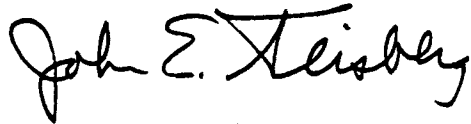
H. AVERAGE AGES AT ENTRY AND RETIREMENT

	<u>Highway Patrol</u>	<u>State Police Officers</u>
The average age at which employment commences is as follows:		
All Current Active Members:	27.5	30.4
	(Including State Police Officers hired after June 30, 1961)	(Those hired prior to July 1, 1961)
New Entrants:		
<u>Fiscal Year</u>		
1971-1972	25.0	27.6
1972-1973	24.1	30.8
1973-1974	33.9	26.7
1974-1975	27.7	
1975-1976	27.1	(Highway Patrol and State Police Officers combined)
1976-1977	27.9	(Highway Patrol and State Police Officers combined)
1977-1978	26.7	(Highway Patrol and State Police Officers combined)
The average age at which service retirements have taken place is as follows:		
All Current Service Retirements:	59.4	(Highway Patrol and State Police Officers combined)
New Retirees:		
<u>Fiscal Year</u>		
1971-1972	57.9	63.5
1972-1973	57.2	62.7
1973-1974	59.5	64.3
1974-1975	59.6	
1975-1976	60.4	(Highway Patrol and State Police Officers combined)
1976-1977	58.2	(Highway Patrol and State Police Officers combined)
1977-1978	57.8	(Highway Patrol and State Police Officers combined)

I. CERTIFICATION BY ACTUARY

Name of Association: Minnesota Highway Patrol Officers'
Retirement Association

We hereby certify that this actuarial valuation of the above-named Association was made as of June 30, 1978, on the basis of accepted actuarial methods and procedures. The valuation was completed in accordance with the requirements of the pertinent chapters of Minnesota Laws.



John E. Teisberg, A.S.A.
Consultant
Towers, Perrin, Forster, & Crosby



Thomas J. Kuhlman, A.S.A.
Associate
Towers, Perrin, Forster & Crosby

HIGHWAY PATROLMEN VALUATION AS OF JUNE 30, 1978

The purpose of this memorandum is to discuss the valuation report of the Minnesota Highway Patrol Officers Retirement Association which was submitted to the Commission in accordance with Minnesota Statutes, Chapter 356. The valuation was made using the entry age normal cost method and assuming 5% interest. The report was prepared by John Teisberg and Thomas Kuhlman of Towers, Perrin, Forster and Crosby. The plan includes the State Police Officers as well as the members of the Highway Patrol.

This memorandum contains the following:

1. Statistical and Valuation Data;
2. Discussion of Valuation Results;
3. Conclusion.

1. Statistical and Valuation Data

Results of the valuation reports as of June 30, 1977 and June 30, 1978 are shown for comparative purposes. Figures are rounded where necessary for simplicity of presentation.

	<u>June 30, 1977</u>	<u>June 30, 1978</u>
(1) <u>Membership</u>		
Active Members	756	751
Deferred Annuitants	17	19
Retired Members	154	165
Disabled Members	8	8
Widows of Deceased Members	76	79
Children of Deceased Members	30	35
(2) <u>Payroll and Annuities Payable</u>	(Thousands of Dollars)	
Total Payroll	\$12,975	\$13,772
Annuities (annual)	1,108	1,290
(3) <u>Valuation Balance Sheet</u>	(Thousands of Dollars)	
Accrued Liability	\$54,026	\$59,643
Assets	<u>32,177</u>	<u>37,265</u>
Unfunded Accrued Liability (Deficit)	\$21,849	\$22,378
Funding Ratio (Assets/Accrued Liability)	59.6%	62.5%

	<u>June 30, 1977</u>	<u>June 30, 1978</u>
(4) <u>Normal Cost and Funding Costs</u>		
	<u>% of Payroll</u>	<u>% of Payroll</u>
Normal Cost	14.45%	14.19%
Administrative Expense	.27	0.25
Normal Cost plus Expense	14.72%	14.44%
Normal Cost plus Expense	14.72%	14.44%
Interest on Deficit	8.42	8.12
Total (minimum Contribution)	23.14%	22.56%*
Normal Cost plus Expense	14.72%	14.44%
Amortization by 1997	12.87	12.80
Total (Required Contribution)	27.59%	27.24%*
(5) <u>Statutory Contributions</u>		
Employee	8.0% of salary	7.0%
Employer Regular	12.0	12.0
Employer Additional	10.00	9.0
Total Contributions	30%	28.0%
(6) Investment Yield *	5.98%	6.54%

* Rate of return on mean assets excluding Minnesota Adjustable Fixed Benefit Fund.

2. Discussion of Valuation Results

The normal cost percentages for the two years are roughly the same, and the small decrease comes from a slight decline in the average entry age.

Although the unfunded liability is about \$500,000 larger than the 1977 figure and although the period to 1997 is one year shorter, the increase in the payroll base was enough to keep the amortization figure as a percentage of payroll about the same as last year's.

The unfunded accrued liability increased from \$21,849,368 to \$22,377,838 during the year, an increase of \$528,470. The following is an approximate analysis of this change.

Increases:

Salary Scale Loss	\$1,804,661	
Mortality and Termination Loss	492,348	
Mortality Loss - MAFB	134,124	
Recognized Depreciation	<u>54,392</u>	
Total Increases		\$2,485,525

Decreases:

Capital Gain	\$ 7,708	
Excess Interest	362,969	
Amortization Contribution	<u>1,586,378</u>	
Total Decreases		\$1,957,055
Net Increase		\$ 528,470

3. Conclusion

In our opinion, the new statutory contributions for this plan are still sufficient to pay the normal cost each year and to retire the deficit by 1997. This opinion is based on cost figures obtained by the entry age normal cost method and upon the valuation assumptions.

Franklin C. Smith
Associate, Society of Actuaries
Commission Actuary

MINNESOTA HIGHWAY PATROL OFFICERS' RETIREMENT FUND

BENEFITS OF PLAN AND CONTRIBUTIONS

This Plan provides the following major benefits:

1. Retirement Benefit

a. Requirements for retirement:

- (1) Age 55 and ten years of service required for full service benefit.
- (2) Ten years of service required for vesting of deferred annuity benefit with payments to start at age 55.

b. Monthly Annuity:

2½% of average monthly salary for each year up to and including 20 years; 2% for each year of service in excess of 20.

c. Average Monthly Salary:

Average of highest five years.

2. Disability Benefit

a. Requirements:

In Line of Duty: None.

Not in Line of Duty: Five years of service and age less than 55.

b. Monthly Annuity:

In Line of Duty: 50% of average monthly salary plus 2% for each year of service in excess of 20.

Not in Line of Duty: 2½% of average monthly salary for each year up to and including 20 years plus 2% for each year in excess of 20; a minimum of 25%.

3. Widow's and Orphan's Benefits

a. Active Members:

(1) Death benefit before retirement:

Widow:	20% of average covered monthly salary.
Orphans:	10% of average covered monthly salary to age 18 or 22 for each child plus \$20 per month prorated equally to such children.

(Maximum total orphan benefit \$400 per month.)

(2) Death benefit after retirement:

None (actuarial equivalent of life annuity may be chosen under an option to provide a widow's benefit). However, the widows of those members who retired or separated from the fund with vested benefits prior to July 1, 1965 will receive \$156.25 per month plus increases authorized in 1976 and 1977.

b. Retired Members: None

4. Other Death Benefit

(Lump Sum): None

5. Termination of Employment Benefit

Refund of Participant's contributions without interest may be applied for upon termination with less than 20 years of service. If refund is not applied for and Participant has completed ten years of service, a vested deferred annuity may be payable commencing at age 55.

Contributions

Members:	7.0%
Employer Regular:	12.0%
Employer Additional:	<u>9.0%</u>
Total	28.0%