

November 22, 1967

INTRODUCTION

Name of Association Minnesota Highway Patrol Officers' Retirement Association

In accordance with Chapter 359 of the 1965 Minnesota Laws and Chapter 249 of the 1967 Minnesota Laws, an actuarial survey as of June 30, 1967 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 Association.

This 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 Being Paid as of June 30, 1967.
- G. Analysis of Changes in Membership.
- H. Average Ages at Entry and Retirement.
- I. Analysis of Actuarial Assumptions.
- J. Certification by Actuary.



MINNESOTA HIGHWAY PATROL OFFICERS' RETIREMENT FUND

A. BENEFITS OF PLAN AND CONTRIBUTIONS

The plan provides the following major benefits:

1. Retirement Benefit.

a. Requirements for retirement:

- (1) Age 55 and 20 years of service required for full service benefit.
- (2) 10 years of service required for vesting of deferred annuity benefit with payments to start at age 55.

b. Monthly annuity when minimum requirements are met:

- (1) \$250 per month.
- (2) \$125 per month.

c. Additional monthly annuity after minimum requirements are met:

- (1) \$5 per month for each year of service in excess of 20.
- (2) \$12.50 per month for each year of service in excess of 10 (after 20 years of service, regular annuity as in (1) is granted.)

2. Disability Benefit.

a. Requirements:

In Line of Duty:	None.
Not in Line of Duty:	10 years of service.

b. Monthly Annuity:

\$250 per month plus \$5 per month for each year of service in excess of 20.

3. Widow's and Orphan's Benefits.

a. Active members:

(1) Death benefit before retirement:

Widow:	\$75 per month.
Orphans:	\$45 per month to age 18 for each child plus \$20 per month prorated equally to such children when there is more than one orphan.

(Maximum total orphan benefit \$175 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 January 1, 1965 will receive \$75 per month.

b. Retired member: None.

4. Other Death Benefit (lump sum): None.

5. Termination of Employment Benefit:

Member contributions returned without interest (except that after 10 years of service a deferred annuity may be elected).

6. Contributions (based on \$6,000 annual salary limit):

Member:	7.0% of covered salary
Employer Regular:	11.2% of covered salary
Employer Additional:	<u>9.0%</u> of covered salary
Total	27.2% of covered 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 extra-
polated 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: No prediction of future salaries was necessary
since the benefits are not based upon salary.
5. Retirement Age: The assumed average age at retirement
for this fund was 57.0.
6. Interest: 3%, compounded annually.

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

C. REVISED RESULTS OF VALUATION

1. Valuation.

Normal Cost of Benefits	\$ 392,772
Total Administrative Expense	4,175
Accrued Liability	8,602,640

2. Current Deficit from Full Funding.

Accrued Liability	\$ 8,602,640
Assets in Fund *	4,306,145
Unfunded Accrued Liability	\$ 4,296,495

3. Annual Payment to Achieve Full Funding by 1997.

Annual Deposit to Retire Deficit by 1997	\$ 212,819
Total Normal Cost	392,772
Total Administrative Expense	4,175
Total Annual Payment	\$ 609,766

4. Minimum Contribution to Prevent Increase in Deficit.

Interest on Deficit at 3%	\$ 128,895
Total Normal Cost	392,772
Total Administrative Expense	4,175
Minimum Contribution	\$ 525,842

5. *Income of Fund during Fiscal Year Ending June 30, 1967.

Members' Contributions	\$ 166,880
Taxes or Public Funds	455,515
Other	0
Total Contributions	\$ 622,395
Investment Income	\$ 151,948

6. *Annual Payroll.

Covered Payroll (\$6,000 limit) as of 6-30-67	\$ 2,299,800
Total Payroll (no limit) as of 6-30-67	\$ 2,594,210

*Data furnished by Association.

D. REVISED 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.

The elements of normal cost for this plan are:

<u>Type of Benefit</u>	<u>Normal Cost</u>
Service Retirement Benefit	\$ 286,753
Disability Benefit	45,445
Withdrawal Benefit	1,312
Survivor's Benefit	40,019
Vesting	19,243
Total Normal Cost	\$ 392,772

This total normal cost and the administrative expense total 17.3% of the total covered payroll as of June 30, 1967.

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	\$ 4,991,188
Disability Benefit	271,141
Withdrawal Benefit	5,003
Survivor's Benefit	191,591
Vesting	207,313
Total for Active Members	\$ 5,666,236
2. <u>Inactive Members</u>	
Retired	\$ 1,886,540
Disabled	45,794
Deferred Retired	353,371
Widows	236,267
Orphans	69,279
Survivor's Benefit	345,153
Total for Inactive Members	\$ 2,936,404
Total Accrued Liability	\$ 8,602,640

E. REVISED ANALYSIS OF CHANGE IN THE UNFUNDED ACCRUED LIABILITY

As of 6-30-66

Total Accrued Liability	\$ 7,874,492	
Assets in Fund	<u>3,730,465</u>	
Unfunded Accrued Liability		\$ 4,144,027

As of 6-30-67

Total Accrued Liability	\$ 8,602,640	
Assets in Fund	<u>4,306,145</u>	
Unfunded Accrued Liability		\$ 4,296,495

Increase in Unfunded Accrued Liability		\$ 152,468
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Increase Because of Changes in Benefits	\$ 403,144	
Decrease Due to Gain from Actual Experience	147,821	
Decrease Due to Last Year's Contributions	<u>102,855</u>	
Net Increase		\$ 152,468

F. REVISED CENSUS OF MEMBERSHIP AND BENEFITS
BEING PAID AS OF JUNE 30, 1967

<u>Status</u>	<u>Number</u>	<u>Annual Payroll</u>
Active Members	386	\$ 2,299,800 (\$6,000 limit)

<u>Status</u>	<u>Number</u>	<u>Annual Benefit</u>
Service Retirements	65	\$ 170,845.56
Disabled Annuitants	1	3,180.00
Widow Annuitants	16	16,386.24
Orphan Annuitants	17	8,460.00
Deferred Annuitants	15	<u>35,610.00</u>
		\$ 234,481.80

G. REVISED ANALYSIS OF CHANGES IN MEMBERSHIP

Active Members

Number as of 6-30-66	377
New Entrants	<u>31</u>
Total	408
Deaths	2
Withdrawals with Vested Benefits	4
Withdrawals without Vested Benefits	4
Retired	11
Disabled	<u>1</u>
Total Terminations	22
Number as of 6-30-67	386

Service Retirements

Number as of 6-30-66	54
Newly Retired	11
Transferred from Deferred Status	<u>2</u>
Total	67
Deaths	2
Number as of 6-30-67	65

Disabled Annuitants

Number as of 6-30-66	None
Newly Disabled	<u>1</u>
Total	1
Number as of 6-30-67	1

Widows Annuitants

Number as of 6-30-66	15
Newly Widowed	<u>3</u>
Total	18
Widows Remarrying	2
Number as of 6-30-67	16

G. REVISED ANALYSIS OF CHANGES IN MEMBERSHIP (Continued)

Orphan Annuitants

Number as of 6-30-66	10
Newly Orphaned	<u>7</u>
Total	17

Number as of 6-30-67	17
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Deferred Annuitants

Number as of 6-30-66	13
New Deferred Annuitants	<u>4</u>
Total	17

Transferred to Retired Status	2
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Number as of 6-30-67	15
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H. AVERAGE AGES AT ENTRY AND RETIREMENT

The average age at which employment commences is as follows:

All Current Members	27.4
New Entrants Fiscal Year 1962-1963	26.1
1963-1964	24.9
1964-1965	26.0
1965-1966	27.5
1966-1967	26.5

The average age at which service retirements have taken place is as follows:

All Current Service Retirements	57.0
New Retireds Fiscal Year 1962-1963	58.0
1963-1964	55.2
1964-1965	58.4
1965-1966	56.8
1966-1967	58.9

I. ANALYSIS OF ACTUARIAL ASSUMPTIONS

In accordance with Chapter 359 of the 1965 Minnesota Laws, an investigation of the basic experience of this fund has been made to substantiate the assumptions which are found in Section B.

The period chosen for this study began January 1, 1958 and ended June 30, 1967. No information for the fiscal year ending June 30, 1966 was furnished by the fund. The active membership for this period ranged from approximately 300 to 380 members. The number of individuals receiving benefits for this period has always been less than 100. Even though the period studied was quite long, it is very difficult to attach a great deal of statistical significance to the results because of the relatively small number of members involved.

Let us consider each of the assumptions as they appear in Section B:

Mortality

The mortality tables used are the 1959-1961 United States Life Tables for White Males and White Females. Mortality was studied separately for the three major groups (Actives, Service Retirements and Widows). Following are the results of this investigation:

	<u>Expected Deaths</u> <u>Based on 59-61 US</u>	<u>Actual</u> <u>Deaths</u>
Actives	11.8	4
Retireds	8.6	5
Widows *	1.0	2

* Deaths and Remarriages included for the Widows

As may be seen by this table, the membership has shown lower rates of mortality than is produced by the 1959-1961 U.S. Tables. However, we felt that a change to another table was not appropriate since a substantial number of the deaths occurred in the fiscal year ending June 30, 1967. We recommend that the mortality be studied carefully in the next several years to determine the trend.

Disability

Because of the size of the fund and the fact that disability rates are quite small, it was felt that very little statistical significance could be attached to the experience of the fund. Therefore, we have adapted rates from the New York State Employees Retirement System which we consider appropriate for this type of organization.

Withdrawal

We have found that the withdrawal among the Active Members was somewhat lower than the rates we have been using. There were 26 actual withdrawals occurring over the period studied compared with 41.1 expected withdrawals. However, for the last fiscal year there were 8 actual withdrawals compared with 4.45 expected withdrawals.

Therefore, we have decided to use the same rates as used previously. We recommend that the trend of the withdrawal rates be studied carefully for the next several years.

Salary Scale

As mentioned in Section B, no prediction of future salaries is necessary. The reason for this is that the benefits are independent of the salaries of the members.

Retirement Age

We have assumed that the average age at retirement will be 57.0. This is the same average retirement age produced by the currently retired members.

Interest

The State Laws require that an interest assumption of 3%, compounded annually, be used.

J. CERTIFICATION BY ACTUARY

Name of Association Minnesota Highway Patrol Officers' Retirement Association

We hereby certify that this actuarial survey of the above named Association was made as of June 30, 1967, on the basis of accepted actuarial methods and procedures. The survey was completed in accordance with the requirements of Chapter 359 of Minnesota Laws 1965 and Chapter 249 of Minnesota Laws 1967.

Franklin C. Smith

Franklin C. Smith
Associate, Society of Actuaries
GEORGE V. STENNES AND ASSOCIATES

HIGHWAY PATROLMEN VALUATION AS OF JUNE 30, 1967

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 Chapter 249 of Minnesota Laws 1967. The valuation was made by our office using the entry age normal cost method and assuming 3% interest.

This memorandum contains the following:

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

Reference can be made to our report of November 18, 1966 for a similar discussion of the actuarial valuation as of June 30, 1966.

1. Statistical and Valuation Data

Results of the valuation reports as of June 30, 1966 and June 30, 1967 are shown for comparative purposes. Figures are rounded where necessary for simplicity of presentation.

(1) <u>Membership</u>	<u>June 30, 1966</u>	<u>June 30, 1967</u>
Active Members	377	386
Deferred Annuitants	13	15
Retired Members	54	65
Disabled Members	0	1
Widows of Deceased Members	15	16
Children of Deceased Members	7	17
(2) <u>Payroll and Annuities Payable</u>	(Thousands of Dollars)	
Total Payroll (no limit)	\$ 2,619	\$ 2,594
Covered Payroll (\$6,000 limit)	2,258	2,300
Annuities (Annual)	152	199
(3) <u>Valuation Balance Sheet</u>	(Thousands of Dollars)	
Accrued Liability	\$ 7,874	\$ 8,603
Assets	<u>3,730</u>	<u>4,306</u>
Unfunded Accrued Liability (Deficit)	\$ 4,144	\$ 4,297
Funding Ratio (Assets/Acc. Liability)	47%	50%

(4) <u>Normal Cost and Funding Costs</u>	<u>June 30, 1966</u>		<u>June 30, 1967</u>	
		<u>% of Covered Payroll</u>		<u>% of Covered Payroll</u>
Normal Cost	\$386,766	17.1%	\$392,772	17.1%
Administrative Expense	<u>5,144</u>	<u>0.2</u>	<u>4,175</u>	<u>0.2</u>
Normal Cost Plus Expense	\$391,910	17.3%	\$396,947	17.3%
Normal Cost Plus Expense	\$391,910	17.3%	\$396,947	17.3%
Interest on Deficit	<u>124,321</u>	<u>5.5</u>	<u>128,895</u>	<u>5.6</u>
Total (Minimum Contribution)	\$516,231	22.8%	\$525,842	22.9%
Normal Cost Plus Expense	\$391,910	17.3%	\$396,947	17.3%
Amortization by 1997	<u>197,331</u>	<u>8.7</u>	<u>212,819</u>	<u>9.3</u>
Total (Required Contribution)	\$589,241	26.0%	\$609,766	26.6%
(5) <u>Statutory Contributions</u>				
Employee		7.4%		7.0%
Employer Regular		11.2		11.2
Employer Additional		<u>9.0</u>		<u>9.0</u>
Total Contributions		27.6%		27.2%
(6) <u>Investment Yield*</u>		3.9%		4.0%

*Ratio of reported investment income to mean reported assets.

2. Discussion of Valuation Results

Since the benefits under this plan are not related to compensation but consist of a stated number of dollars for a participant who qualifies, the amount of covered salary is used only for the purpose of determining the amount of contributions to the fund. Therefore, unlike the other statewide funds, the ceiling on covered salary was not removed during the 1967 Session of the Legislature.

However, the 1967 Legislature did make some changes in benefits in other directions. It provided a post retirement widows benefit for those members who retired or terminated with vested benefits prior to January 1, 1965. It also made the amount of the monthly benefits the same for all widows and children who are currently receiving benefits. This action increased the amount of the benefit for certain groups.

The above changes added about \$403,000 to the reserves but did not affect the normal cost since they did not apply to active members. As a result, the normal cost as a percentage of covered payroll remained the same.

The unfunded accrued liability has increased from \$4,144,027 to \$4,296,495, an increase of \$152,468. This increase may be broken down as follows:

Increase from Changes in Benefits		\$ 403,144
Decrease from Actuarial Gains	\$ 147,821	
Decrease from Amortization	<u>102,855</u>	<u>250,676</u>
		\$ 152,468

With a slight decrease in the employee contribution rate accompanying the increase in the unfunded accrued liability, the excess of the total statutory contribution over the required contribution has declined from 1966 to 1967. The memorandum on the 1966 valuation indicated that the deficit could be retired by 1990. On account of the above changes, it is necessary to revise this prediction to state that the deficit could be retired by 1994 if the present level of costs and contributions is continued.

3. Survey of Experience

The Report also contains a review of actual experience compared with the actuarial assumptions. Since the number of participants is relatively small, data for a period of seven and a half years were used.

The rate of mortality and the withdrawal rate are both less than the assumed rates. However, since a good proportion of the deaths and terminations occurred during the last fiscal year, it was decided that a change in these assumptions would not be recommended at this time.

The number of disablements has been too small to form the basis of any study.

The average age at retirement for all members receiving benefits at the present time is exactly equal to the assumed retirement age of 57.0. The average age for retirements during the past year was 58.9. In two of the past five years, the average age for retirements fell below 57; in the other three, it was 58 or over.

The 3% interest assumption is fixed by statute. Over the past three years, the funds have earned 3.8%, 3.9% and 4.0%.

In summary, we decided not to recommend any changes in actuarial assumptions, but the mortality and termination experience should be watched closely.

4. Conclusion

In our opinion, the statutory contributions for this plan are sufficient to pay the normal cost each year and to retire the deficit before 1997. This opinion is based upon cost figures obtained by the entry age normal cost method and upon our valuation assumptions and the benefits provided by the plan as of June 30, 1967.

Franklin C. Smith
Associate, Society of Actuaries
GEORGE V. STENNES AND ASSOCIATES
Commission Actuaries