ACTUARIAL REPORT

DULUTH TEACHERS' RETIREMENT FUND ASSOCIATION

AS OF JUNE 30, 1980

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PREPARATION OF THIS ACTUARIAL REPORT

AS OF JUNE 30, 1980

DULUTH TEACHERS' RETIREMENT FUND ASSOCIATION

This report has been prepared in accordance with generally accepted actuarial principles and practices. This actuarial valuation was made in accordance with the provisions of Sections 356.20 to 356.23 of Minnesota Statutes 1969, as amended. The material from which this report was prepared consisted of personnel data furnished by the Association, the annual report of Eikill and Schilling for the Association, and actuarial tables compiled by Hewitt Associates. The usual care has been exercised in making the calculations and presenting the results. The contents of this report are, therefore, believed to be a correct appraisal of the state of affairs of the Plan.

Respectfully submitted,

HEWITT ASSOCIATES

Richard L. Moody

Richard L. Moody
Fellow, Society of Actuaries

October 17, 1980

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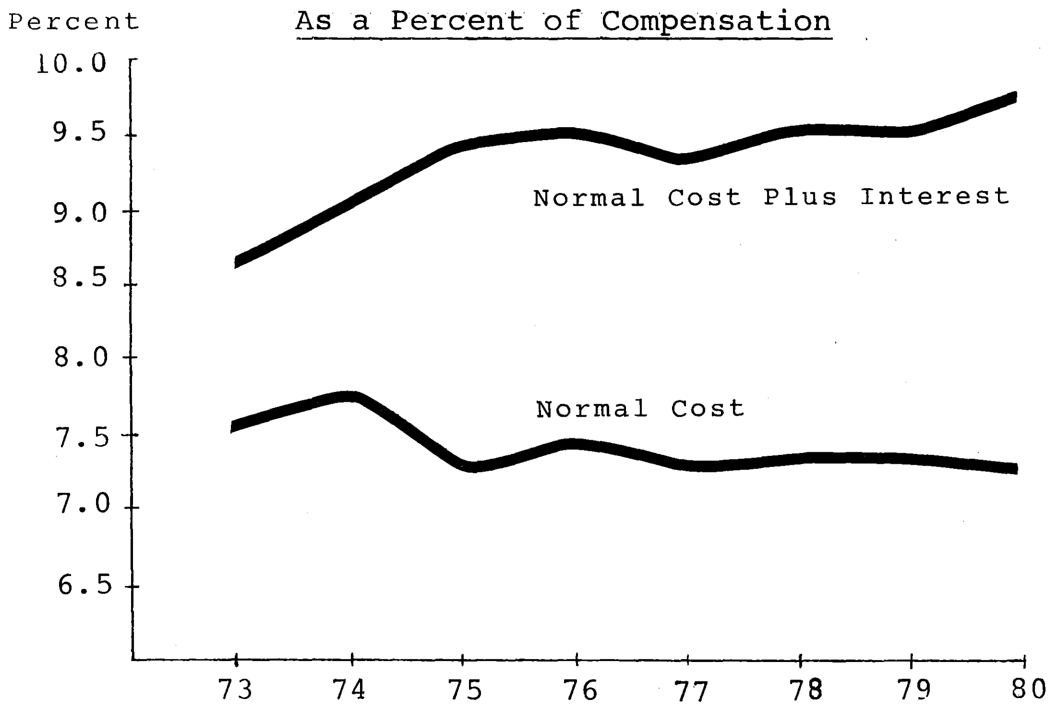
SUMMARY*

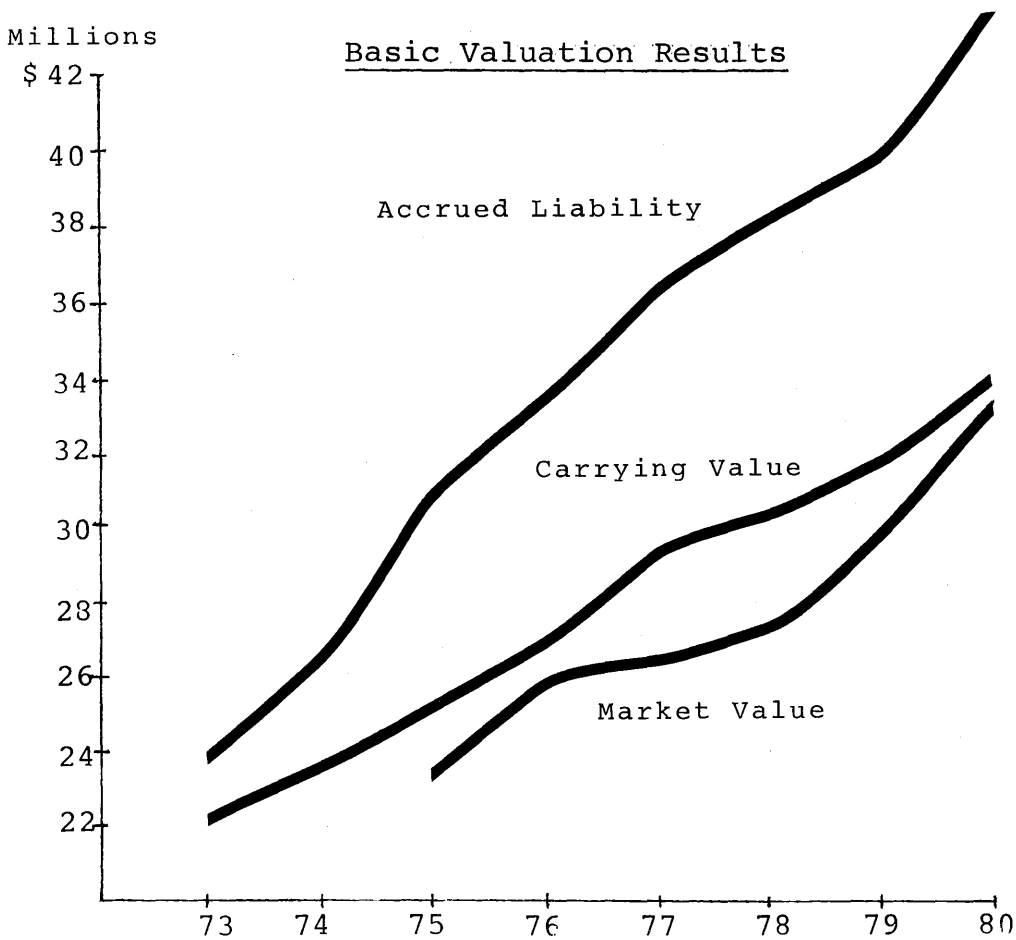
	June 30, 1980	June 30, 1979
Accrued Liability	$43,713,374	$39,882,072
Carrying Value of Assets	33,801,048	31,774,026
Unfunded Accrued Liability	$ 9,912,326	$ 8,108,046
Normal Cost as Percent of Compensation	7.25%	7.33%
Contribution as a Percent of Compensation Based on Normal Cost plus:		
Interest only	9.76%	9.54%
Amortization by 1997	11.34%	10.82%
Amortization by 2009	10.41%	10.08%
Value of Accrued Benefits		
Vested Only	$24,081,511	$21,215,625
All Accrued	25,120,515	21,729,978
Market Value of Assets	$33,078,479	$29,794,671
Number of Members		
Active	1,268	1,272
Retired	501	494
Terminated Deferred Vested	50	51
Total	1,819	1,817

* Based on statutory interest rate and salary scale.

Normal Cost and Contributions (Normal Cost Plus Interest)
As a Percent of Compensation



Basic Valuation Results



LIABILITIES, ASSETS, NORMAL COST

The results of the actuarial valuation as of June 30, 1980, are set forth below:

Present Value of Projected Benefits	$63,577,386
Present Value of Future Normal Costs	19,864,012
Accrued Liability	$43,713,374
Carrying Value of Assets (page II-A-3)	33,801,048
Unfunded Accrued Liability	$ 9,912,326
Present Value of Future Normal Costs as a Percent of Present Value of Future Compensation	7.25%
Current Compensation for Members under the Assumed Retirement Age	$23,054,277
Normal Cost Based on Current Compensation	$ 1,671,435

LIABILITIES, ASSETS, NORMAL COST (Continued)

Actuarial Balance Sheet

Present and Prospective Assets

Carrying Value of Assets	$33,801,048
Present Value of Future Member Contributions (4%)	10,959,455
Present Value of Future Contributions of the State of Minnesota (3.25%)	8,904,557
Unfunded Accrued Liability	9,912,326
Total	$63,577,386

Present and Prospective Liabilities

Present Value of Benefits Payable on Account of:	
Service Retirement Annuitants	$12,911,600
Disability Retirement Annuitants	52,024
Beneficiaries	436,130
Deferred Vested	262,456
Present Value of Future Benefits Anticipated on Account of Present Active Members for:	
Service Retirement	$39,307,734
Disability Retirement	3,598,829
Withdrawal Prior to Retirement	3,537,734
Death Prior to Retirement	3,470,879
Total	$63,577,386

Determination of Carrying Value of Assets

1.	Carrying Value of Assets, 6/30/79	$31,774,026
2.	Contributions	2,369,609
3.	Benefits Paid	1,765,742
4.	Assumed Investment Return at 5% on:	
	a. Carrying Value of Assets, line (1)	1,588,701
	b. Contributions, line (2)	59,240
	c. Benefits Paid, line (3)	44,144
	d. Total, (4a)+(4b)-(4c)	$ 1,603,797
5.	Expected Value of Assets, 6/30/80, (1)+(2)-(3)+(4d)	$33,981,690
6.	Market Value, 7/1/80*	$33,078,479
7.	Adjustment Towards Market Value, 20% of (6)-(5)	$ (180,642)
8.	Carrying Value of Assets, 6/30/80, (5)+(7)	$33,801,048

*Recognizes marketable common stocks valued at market and total bonds and notes valued at cost.

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CONTRIBUTIONS

Required Support Levy from the State of Minnesota

Active members of the Fund contribute 4% of their compensation to meet part of the cost of the Plan. The following tables indicate the total contributions and the support levy from the State of Minnesota, expressed as a percent of compensation, required to meet the remaining cost of the Plan. The expense entries shown have been determined by dividing the 1979-80 expense (excluding Investment Advisor's fees) by current compensation.

Normal Cost Plus Interest on Unfunded Accrued Liability

	Total	State of Minnesota
Normal Cost	7.25%	3.25%
Interest on Unfunded Accrued Liability	2.05%	2.05%
Expenses	.46%	.46%
Total	9.76%	5.76%

Normal Cost Plus Amortization of Unfunded Accrued Liability by 1997

	Total	State of Minnesota
Normal Cost	7.25%	3.25%
Payment on Unfunded Accrued Liability	3.63%	3.63%
Expenses	.46%	.46%
Total	11.34%	7.34%

Normal Cost Plus Amortization of Unfunded Accrued Liability by 2009

	Total	State of Minnesota
Normal Cost	7.25%	3.25%
Payment on Unfunded Accrued Liability	2.70%	2.70%
Expenses	.46%	.46%
Total	10.41%	6.41%

EXPERIENCE

Changes in Unfunded Accrued Liability

The unfunded accrued liability as determined on the basis of an interest assumption of 5.0% increased from $8,108,046 on June 30, 1979, to $9,912,326 on June 30, 1980. This increase of $1,804,280 reflects the net effect of the reduction from contributions, and the experience loss under the Plan.

The actuarial valuation report as of June 30, 1979, based on a 5.0% interest assumption, indicated a required support levy of 5.54% of compensation by the State of Minnesota to keep the unfunded accrued liability from increasing (that is, to meet the normal cost payment, pay interest on the unfunded accrued liability, and to meet expenses). The actual contribution by the State of Minnesota was 5.70% of compensation (0.16% of compensation more than required). Thus, the contribution made reduced the unfunded accrued liability by $34,449 (0.16% of $21,530,456).

Since the unfunded accrued liability increased, the actual experience under the plan for the year resulted in an actuarial loss. The amount of the actuarial loss was $1,838,728 which is the balancing item between the contribution excess and the increase in the unfunded accrued liability.

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EXPERIENCE (Continued)

Normal Cost Percentage

The normal cost percentage decreased slightly from 7.33% on June 30, 1979, to 7.25% on June 30, 1980.

Actuarial Loss

During the 1979-1980 school year, there was an actuarial loss (i.e., an unanticipated increase in the unfunded accrued liability because of experience) of over $1,838,000. This compares with a total accrued liability of over $43,700,000 on June 30, 1980.

The primary source of this loss was compensation increases in excess of the assumed salary increases of 3-1/2%. For members who were active in both the 1979 and 1980 valuations, the average compensation increased 9.29% from $18,484 for 1979 to $20,202 for 1980. This experience produced an actuarial loss of almost $1,400,000. Investment experience produced an additional loss of about $189,000. The annual market value rate of return was about 8.90%. This percentage was determined by starting with the market value on June 30, 1979, and adding contributions, less benefit payments (assuming these amounts were paid in the middle of the year). There was an investment loss, even though the assets earned at a rate in excess of the interest assumption, since the carrying value of assets exceeded the market value by about 6.6% on June 30, 1979. The mortality experience among the retired members produced a loss of about $200,000 as less liability was released than expected. The average age of the 15 new service retirements was lower than the assumed retirement age of 63, producing an additional loss.

ACCRUED BENEFIT VALUES

The Financial Accounting Standards Board Statement No. 35 was issued in March of 1980 for reporting in the annual financial statements of the plan. This statement requires the inclusion of the present value of vested benefits and all accrued benefits determined on an ongoing plan basis. The standards require the inclusion of these amounts for plan years beginning after December 15, 1980, with earlier application encouraged.

To provide guidance for consistent actuarial practice in the determination of accrued benefit values for an ongoing plan, the American Academy of Actuaries has recommended procedures for calculating the present value of vested benefits (Interpretation 1) and the present value of accrued benefits (Interpretation 2). In the judgment of the Academy Committee on Pension Actuarial Principles and Practices, these Interpretations are acceptable for the determination of both vested and all accrued benefit values.

Both Interpretations include the present value as of June 30, 1980, of the sum of: (a) all benefits expected to be paid to former members, and their beneficiaries, who have retired or have terminated with vested rights, and (b) benefits expected to be paid at future dates to present active members, based only on compensation and service prior to June 30, 1980, as further described in the next two paragraphs.

The calculation of the present value of vested benefits using Interpretation 1, as shown on page III-2, represents only the benefits in which an active member retains a right, independent of continuation of employment. It does not include any additional benefits which might arise because of the future death or disability of a member that become payable only if the member remains employed until death or disability.

The calculation of the present value of all accrued benefits using Interpretation 2, also shown on page III-2, represents all accrued benefits expected to become payable at future dates, including the accrued portion of disability or preretirement death benefits which are expected to become payable. In addition, members who are not vested in any benefits as of June 30, 1980 are included in this calculation based on their current accrued benefits that are expected to become payable upon the occurrence of future events (termination, retirement, etc.) and the probability of becoming eligible for such benefits.

ACCRUED BENEFIT VALUES (Continued)

Detailed Comparison of Values

These present values represent the single sum values based on the actuarial assumptions described on page V-B-1 of this report. With the exception of the interest rate, where 7% has been assumed for purposes of the accrued benefit values, these are the same assumptions as used for determining the valuation results that produce the contribution requirements for this plan. The basic retirement benefit on which these calculations were made was the estimated benefit accrued to June 30, 1980, for each member based on the actual five-year average compensation, which was calculated from the actual compensation reported for the previous five school years.

Present Value of Vested Benefits	
Retired (Including Beneficiaries)	$11,852,681
Terminated Deferred Vested Members	178,750
Active Members	12,050,080
Total, Vested Benefits	$24,081,511
Present Value of Nonvested Benefits	1,039,004
Total Present Value of Accrued Benefits	$25,120,515
Assets	
Carrying Value	$33,801,048
Market Value	33,078,479

Changes in Value

Since the actuarial valuation as of June 30, 1979, there have been no amendments to the plan or changes in the actuarial assumptions. The change in the accrued benefit values between the June 30, 1979, and June 30, 1980, calculation dates was an increase of $3,390,537 as shown below:

Present Value of All Accrued Benefits	
June 30, 1980	$25,120,515
June 30, 1979	21,729,978
Increase	$ 3,390,537

PERSONNEL INVENTORY

The following tables show the changes that occurred in the active and retired membership from June 30, 1979, to June 30, 1980. The following pages provide more information pertaining to these members.

Active Members, June 30, 1979	1,272
New Entrants	90
Total	1,362
Separations from Active Service:	
Refund of Contributions	78
Separation With Deferred Annuity	0
Separation Without Refundment or Deferred Annuity	0
Disability	1
Death	0
Service Retirement	15
Total Separations	94
Active Members, June 30, 1980	1,268

	Number	Annual Benefits
Service Retirements as of June 30, 1979	471	$1,570,178
New Retirements	19	89,005
Total	490	$1,659,183
Terminations:		
Death	15	$ 47,067
Other	0	9,156*
Total	15	$ 56,223
Service Retirements as of June 30, 1980	475	$1,602,960
Disability Retirements as of June 30, 1979	2	$ 3,509
New Retirements	1	2,056
Total	3	$ 5,565
Terminations	0	0
Disability Retirements as of June 30, 1980	3	$ 5,565
Beneficiaries as of June 30, 1979	21	$ 45,242
New Entrants	2	7,056
Total	23	$ 52,298
Terminations	0	0
Beneficiaries as of June 30, 1980	23	$ 52,298

* Reflects reduction to age 62 benefit under Social Security adjustment option.

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Active Membership Characteristics

There were 1,268 active members in the personnel data submitted as of June 30, 1980. Included in this total are 14 members who were on leave of absence. Shown below are the personnel characteristics of the 1,268 members. The average age is computed to years and completed months on the valuation date and the average service is the number of years and months from the date of appointment to the valuation date. The average compensation is the actual compensation during the 1979-1980 school year.

Number	1,268
Average Age	42.0
Average Service	10.6
Average Age at Hire	31.4
Total Compensation	$23,248,028
Average Compensation	$ 18,334

Distribution of Active Members

Page IV-4 shows the distribution of active members by age last birthday and completed years of service on June 30, 1980. A key showing the contents of the age and service breakdown is shown in the upper right hand corner of the page. All members hired at the same age lie along the same diagonal line.

Several observations can be made by the use of these charts:

- the number of members who will become eligible for early or normal retirement benefits in the next few years
- the number of members who will reach the vesting requirements in the next few years
- number of members effected by changes in other benefits related to service (e.g., additional benefits for those with certain minimum service)
- number of hires per year for all past years who have remained with the School District and hiring patterns by age of hire
- some idea of median age and service figures that averages do not take into account.

Distribution of Active Members (Continued)

Supplementing these age/service distributions are two sets of graphs. The first graph (on page IV-5) illustrates the distribution of these members by five-year age groups, showing the average service and compensation for each group, and indicates separately the number of members, average service and average compensation for each age 55 and over.

The second graph (on page IV-6) shows the percentage of active members age 55 and over by expected service at age 65 classifications. This second graph can assist in reviewing the level of retirement benefits these individuals will receive at retirement.

Retired Members Information

There were 501 retired members in the personnel data submitted as of June 30, 1980. These members and their annual benefits can be summarized as follows:

	Number	Annual Benefits
Service Retirements		
Males	81	$ 337,457
Females	394	1,265,503
Total	475	$1,602,960
Disability Retirements		
Males	1	$ 2,056
Females	2	3,509
Total	3	$ 5,565
Beneficiaries (All Females)	23	52,298
Total All Retirements		
Males	82	$ 339,513
Females	419	1,321,310
Total	501	$1,660,823

In addition, there were 22 members who resigned and elected a deferred annuity and 28 members who have repaid their contribution to reinstate prior service years.

Distribution of Pensioners

The graph on page IV-7 shows the distribution of the 475 service retirements by age last birthday and completed years since retirement as of June 30, 1980.

DISTRIBUTION OF PERSONNEL BY AGE AND YEARS OF SERVICE

DULUTH TEACHERS' RETIREMENT FUND ASSOCIATION
ACTIVE MEMBERS

- This distribution shows personnel by age, sex, and completed years of service as of 7-1-80. Males are shown in the upper left corner of each cell, and females in the lower right. For instance, the cell at age 30 and 6 years of service contains 4 males and 3 females.
- Individual careers progress along a diagonal (stair-step) line; e.g., all employees hired at age 25 appear on the diagonal which starts at age 25 with 0 service and runs through 26 and 1, 27 and 2, etc.
- The average age of this group is 42.0 and the average service is 10.6.

Age	Male	Female	Total
15			
16			
17			
18			
19		1	1
20		1	1
21			
22		3	3
23	1	2	3
24	2	2	4
25	3	19	22
26	4	17	21
27	5	27	32
28	9	18	27
29	9	36	45
30	12	32	44
31	22	19	41
32	20	25	45
33	14	28	42
34	15	19	34
35	25	26	51
36	24	19	43
37	30	25	55
38	19	23	42
39	19	16	35
40	24	14	38
41	17	18	35
42	17	16	33
43	15	16	31
44	20	18	38
45	20	16	36
46	19	15	34
47	18	18	36
48	19	12	31
49	17	26	43
50	22	16	38
51	30	14	44
52	14	19	33
53	18	13	31
54	17	10	27
55	14	7	21
56	14	13	27
57	7	14	21
58	9	5	14
59	11	9	20
60	3	11	14
61	4	4	8
62	1	8	9
63	5	4	9
64	3	2	5
65			
66	1		1
Total	592	676	1,268

Years of Service	Male	Female	Total
0	26	62	88
1	11	98	109
2	7	31	38
3	18	53	71
4	10	36	46
5	11	30	41
6	30	27	57
7	32	52	84
8	30	37	67
9	35	28	63
10	39	31	70
11	38	43	81
12	41	23	64
13	22	18	40
14	21	14	35
15	19	8	27
16	26	12	38
17	17	11	28
18	26	10	36
19	15	6	21
20	26	7	33
21	13	7	20
22	16	9	25
23	11	4	15
24	11	4	15
25	8	3	11
26	10	4	14
27	3	3	6
28	7		7
29	3		3
30	3		3
31	1	3	4
32	2	1	3
33	4	1	5

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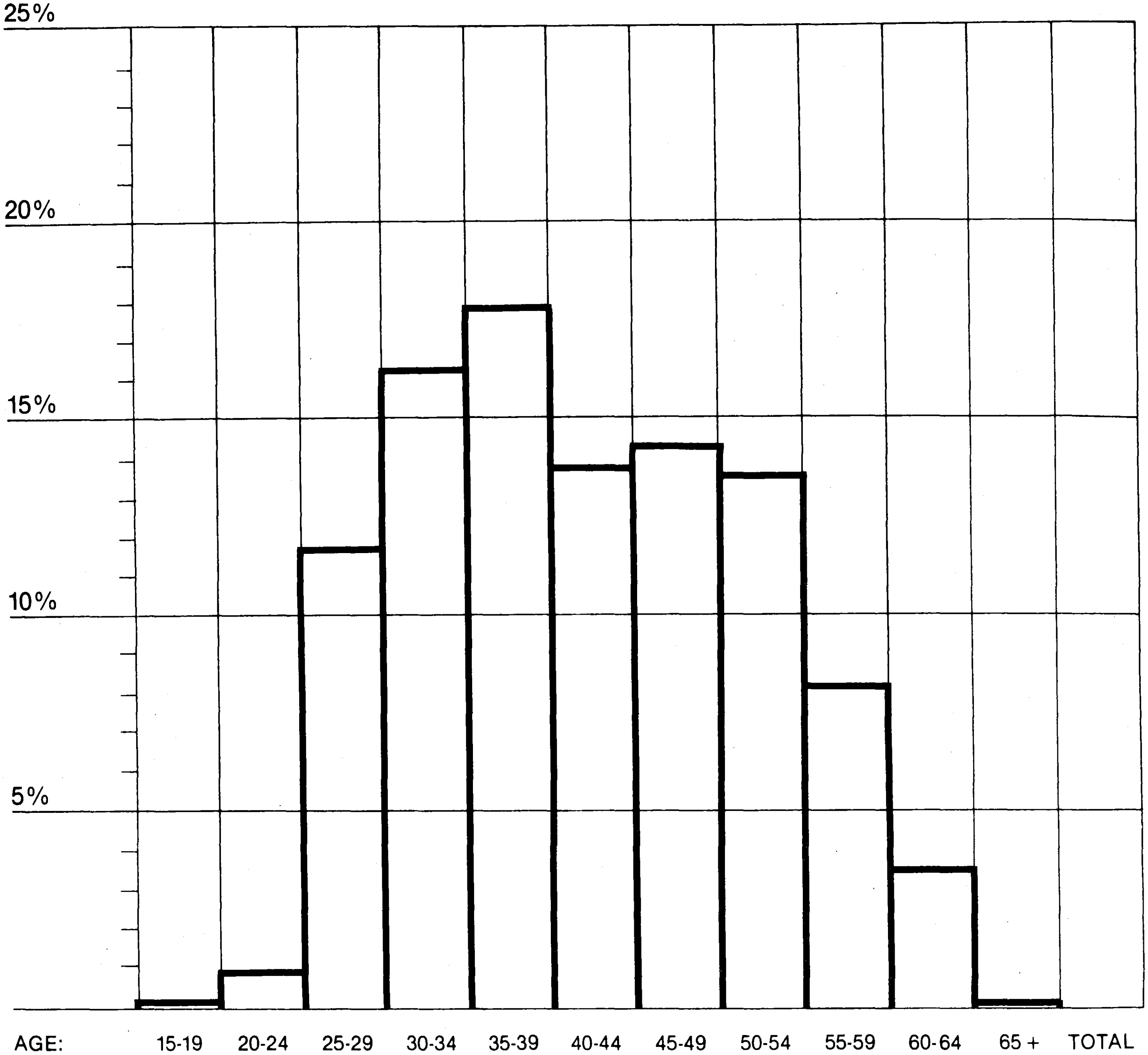
DISTRIBUTION OF PERSONNEL BY AGE

DULUTH TEACHERS' RETIREMENT FUND ASSOCIATION
ACTIVE MEMBERS



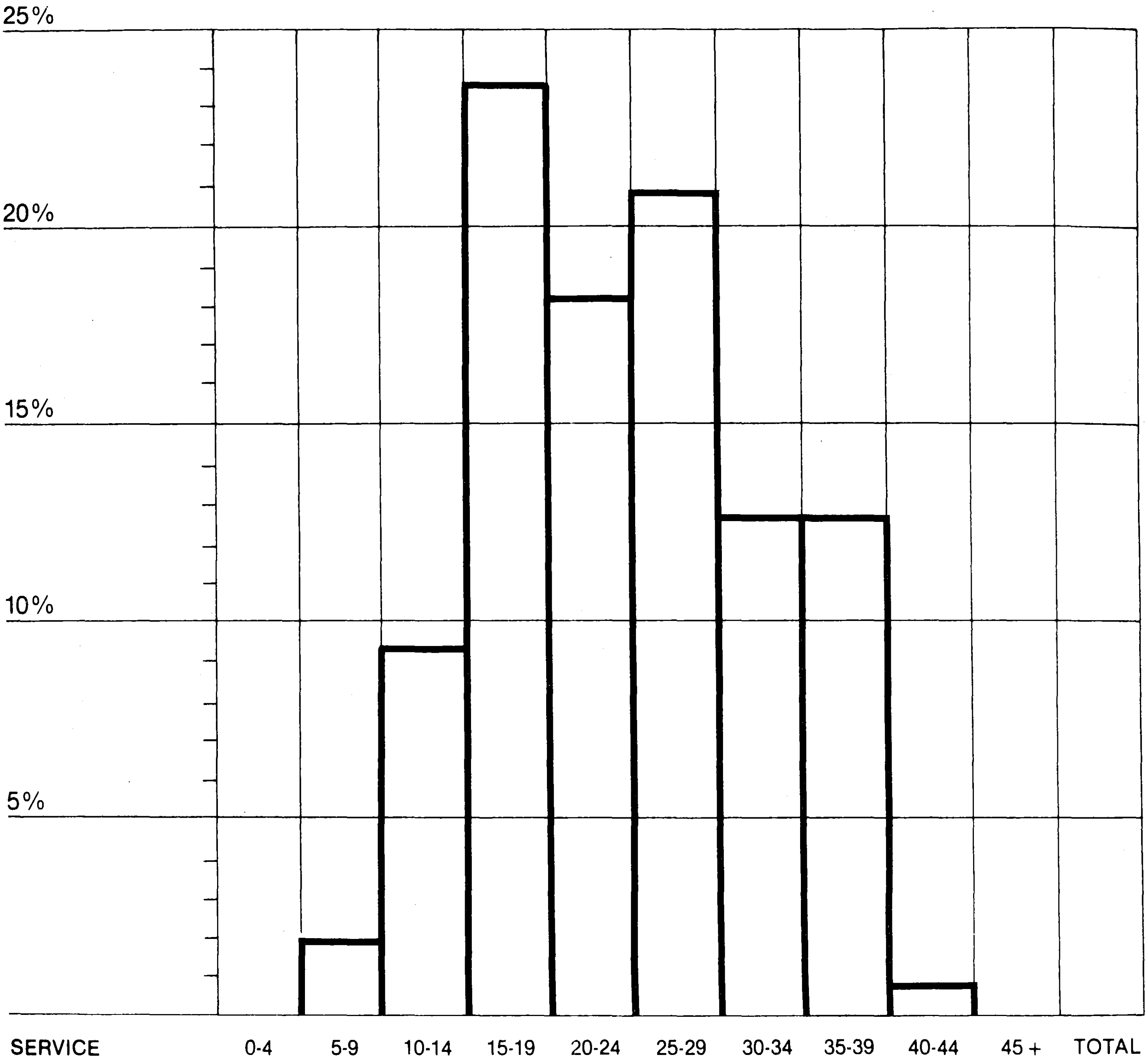
AGE:	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 +	TOTAL
NUMBER	1	11	147	206	226	175	180	173	103	45	1	1,268
AVERAGE SERVICE	1.8	1.1	3.1	5.8	8.7	10.8	13.8	16.0	17.8	19.8	18.8	10.6
AVERAGE PAY	14,467	8,362	11,660	14,949	18,865	20,077	20,972	22,034	21,244	20,866	24,238	18,467

DETAIL OF EMPLOYEES AGE 55 & OVER

AGE:	55	56	57	58	59	60	61	62	63	64	65	66	67+
NUMBER	21	27	21	14	20	14	8	9	9	5	0	1	0
AVERAGE SERVICE	20.4	17.1	15.3	19.7	17.4	21.4	19.9	17.7	19.0	20.5	0.0	18.8	0.0
AVERAGE PAY	22,818	21,492	19,295	21,570	21,072	20,759	22,023	20,104	20,893	20,816	0	24,238	0

DISTRIBUTION OF PERSONNEL BY EXPECTED SERVICE AT AGE 65
(BASED ON PERSONNEL AGE 55 AND OVER)

DULUTH TEACHERS' RETIREMENT FUND ASSOCIATION
ACTIVE MEMBERS



	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45 +	TOTAL
NUMBER	0	3	14	35	27	31	19	19	1	0	149
AVERAGE SERVICE AT AGE 65*	0.0	6.8	12.9	17.9	22.9	27.4	32.6	37.4	40.9	0.0	24.6
AVERAGE PAY	0	12,709	19,510	20,770	20,239	21,335	23,325	23,333	19,621	0	21,156

*OR CURRENT AGE IF OLDER

DISTRIBUTION OF RETIREES BY AGE AND YEARS SINCE RETIREMENT

DULUTH TEACHERS' RETIREMENT FUND ASSOCIATION
SERVICE RETIREMENTS

- This distribution shows retirees by age, sex, and completed years since retirement as of 7-1-80. Males are shown in the upper left corner of each cell, and females in the lower right. For instance, the cell at age 72 and 7 years since retirement contains 3 males and 5 females.
- Individuals retiring at the same age progress along a diagonal (stair-step) line; e.g., all employees retiring at age 65 appear on the diagonal which starts at age 65 with 0 years since retirement and runs through 66 and 1, 67 and 2, etc.

Age	Male	Female	Total
45–			
50			
55		1	1
56	1	2	3
57		1	1
58	2	4	6
59	1	2	3
60		5	5
61	3	5	8
62	4	6	10
63	2	11	13
64		9	9
65	4	16	20
66	1	16	17
67	3	18	21
68	4	9	13
69	4	17	21
70	7	22	29
71	6	21	27
72	3	23	26
73	4	16	20
74	3	17	20
75	7	12	19
76	2	19	21
77	6	14	20
78	1	10	11
79	2	12	14
80	1	16	17
81		10	10
82	1	8	9
83	2	15	17
84	1	6	7
85	2	6	8
86		9	9
87	2	7	9
88		9	9
89		5	5
90			
91		8	8
92		2	2
93		1	1
94	1	1	2
95		1	1
96			
97			
98	1	1	2
99		1	1
100+			
All ages	81	394	475

Years since retirement	Male	Female	Total
0	8	11	19
1	4	10	14
2	3	21	24
3	1	28	29
4	6	20	26
5	4	18	22
6	8	19	27
7	10	28	38
8	6	26	32
9	7	23	30
10	4	25	29
11	7	13	20
12		20	20
13	1	19	20
14	1	14	15
15	2	11	13
16	2	6	8
17	2	18	20
18	1	7	8
19		2	2
20		7	7
21		10	10
22	1	3	4
23		6	6
24		3	3
25		3	3
26	2	2	4
27		6	6
28			
29		2	2
30		1	1
31		3	3
32		3	3
33		1	1
34			
35		2	2
36		2	2
37–41			
42	1		1
43		1	1
44			
45+			

PLAN PROVISIONS

Effective Date	December 31, 1957.
Coverage	Any teacher in the employ of the Board of Education of the City of Duluth who elects to make the required contributions. Includes the superintendent, supervisors, principals, instructors and association staff members.
Active Member	A member who is making contributions under this Plan.
Inactive Member	A member who is no longer making contributions under the Plan and who has not withdrawn his contributions.
Credited Service	Service as an employee of the school district for which required contributions are made to this Plan. One full year of credit shall be given for each full school year but not more than one year of credit shall be given for any 12-month period. Credit for part of a year shall be in proportion to the required contributions for a full school year, computed to the nearest tenth of a year.
Final Average Salary	Average annual cash remuneration, including any such cash remuneration for assignment to extra-curricular services, during the five school years yielding the highest average.
Normal Retirement Benefit	
Eligibility	Age 60.
Amount	Annual normal retirement benefit equal to 1.15% of the member's final average salary multiplied by the number of years of credited service. The minimum annual normal retirement benefit to a member who was a member on June 30, 1971, consists of:

Normal Retirement Benefit (Continued)	
Amount (Continued)	(i) An annuity of equivalent actuarial value to two times the accumulated regular contributions to the member; plus (ii) An annuity equal to 20% of the annuity determined in (i) above.
Early Retirement Benefit	
Eligibility	Age 55 and ten years of credited service.
Amount	A deferred benefit commencing at age 60 equal to the amount computed as a normal retirement benefit on the basis of his average final compensation and years of credited service at the time of his retirement; in lieu of such deferred benefit an immediate benefit of equivalent actuarial value.
Disability Retirement	
Eligibility	Five or more years of credited service and permanently incapacitated for teaching service.
Amount	Equal to the normal retirement benefit determined on the basis of his average final salary and years of credited service at the time of his disability.
Vested Retirement	
Eligibility	Ten or more years of credited service if member does not elect to withdraw his accumulated contributions.
Amount	Deferred benefit commencing at age 60 or the first day of the month following receipt of the application for the benefit, whichever is later, and is equal to the amount computed as a normal retirement benefit on the basis of his final average salary and

Vested Retirement (Continued)

Amount (Continued)

years of credited service at the time of his termination. In lieu of the deferred benefit, a member who has attained age 55 may elect to receive an immediate allowance of equivalent actuarial value. In lieu of a Vested Retirement Benefit, any member may elect to withdraw his accumulated contributions.

Death Benefit

Before Retirement

Two times the member's accumulated regular contributions or if the deceased member had completed ten or more years of credited service and had designated as his beneficiary his surviving spouse to whom he had been married for at least three years, the surviving spouse may elect, in lieu of the lump sum payment, an immediate or deferred annuity of equivalent actuarial value to the member's accumulated regular contributions and the matching funds of the district, increased by 20%.

After Retirement

The excess, if any, of a member's accumulated regular contributions at retirement over the total amount received as retirement allowance payments is paid in a lump sum to his designated beneficiary or estate provided that he has not elected an optional benefit that has become effective. If an option has become effective, the terms of the option are to govern.

Refund of Contributions

Upon termination of employment for reasons other than death or retirement, a refund of his accumulated contributions is payable in lieu of any other benefits from the Association.

Upon the death of a terminated member entitled to a vested retirement benefit, whose death occurs prior to the commencement of his retirement allowance, the amount of his own accumulated contributions at the time of his death is payable in a single sum.

Optional Benefits

Normal, early or disability retirement benefits may be paid in one of the following optional forms of equivalent actuarial value:

Option 1. A reduced retirement benefit payable during the member's life, with the provision that after his death it is paid to his contingent annuitant for life.

Option 2. A reduced retirement benefit payable during the member's life, with the provision that after his death one-half of such reduced allowance is paid to his contingent annuitant for life.

Option 3. A reduced retirement allowance payable during the member's life, with the provision that if his death occurs within a period of five, ten, fifteen or twenty years, the reduced benefit is continued for the balance of the designated period.

Annuity Values

Effective July 1, 1969, annuity values for converting a member's accumulated contributions to monthly payments, where applicable, are to be based on an interest rate of 5% per annum, compounded annually.

Contributions

Members: 4% of annual salary.

State of Minnesota: 5.79% of salary of active members.

ACTUARIAL ASSUMPTIONS
(Adopted effective June 30, 1978)

Actuarial Method	Entry Age Normal actuarial cost method with normal cost determined as a level percentage of current and future compensation.
Investment Return	Five percent compounded annually.
Salary Increases	Three and one-half percent per year until retirement.
Retirement Age	Age 63 (at present age if greater than age 63).
Valuation of Assets	The basis for determining the carrying value of assets was changed with the June 30, 1978, valuation, using as a starting value the carrying value of assets developed from the prior basis in the June 30, 1977, valuation report. Under the new basis, the expected value of assets is calculated starting with the prior year's carrying value, adding in the expected investment return at the valuation interest rate, adding the mandatory employee and State of Minnesota contributions and subtracting benefit payments. Both contributions and benefit payments are adjusted for interest to reflect the estimated timing of the amounts into and out of the fund. The carrying value then equals the expected value plus 20% of the difference between market value and the expected value.
Mortality	
Non-Disabled Lives	See page V-B-2 (UP-1984 Mortality Table set back two years).
Disabled Lives	The 1956 Disability Mortality Table.
Withdrawal	See page V-B-2.
Disability	See page V-B-2.
Expenses	Actual expenses for previous year (excluding investment management fees) as a percent of valuation payroll.

ACTUARIAL ASSUMPTIONS (Continued)
Probability of Withdrawal, Disability and Death

Age	Withdrawal	Disability	Death	Age	Withdrawal	Disability	Death
18	.2000	.0028	.0014	53	.0067	.0074	.0062
19	.2000	.0028	.0014	54	.0040	.0080	.0069
20	.2000	.0028	.0014	55	.0013	.0087	.0075
21	.1931	.0028	.0014	56	.0000	.0095	.0083
22	.1731	.0028	.0013	57	.0000	.0104	.0090
23	.1532	.0028	.0013	58	.0000	.0114	.0099
24	.1332	.0028	.0012	59	.0000	.0125	.0108
25	.1132	.0028	.0012	60	.0000	.0136	.0119
26	.0932	.0028	.0011	61	.0000	.0149	.0130
27	.0732	.0028	.0011	62	.0000	.0163	.0142
28	.0703	.0028	.0011	63	.0000	.0000	.0155
29	.0673	.0028	.0011	64	.0000	.0000	.0170
30	.0643	.0028	.0011	65	.0000	.0000	.0187
31	.0612	.0028	.0011	66	.0000	.0000	.0205
32	.0582	.0028	.0011	67	.0000	.0000	.0226
33	.0552	.0028	.0011	68	.0000	.0000	.0248
34	.0522	.0028	.0012	69	.0000	.0000	.0272
35	.0491	.0029	.0012	70	.0000	.0000	.0296
36	.0461	.0029	.0013	71	.0000	.0000	.0321
37	.0430	.0030	.0014	72	.0000	.0000	.0347
38	.0409	.0031	.0015	73	.0000	.0000	.0377
39	.0389	.0031	.0016	74	.0000	.0000	.0409
40	.0368	.0032	.0018	75	.0000	.0000	.0445
41	.0347	.0033	.0019	76	.0000	.0000	.0485
42	.0325	.0035	.0021	77	.0000	.0000	.0529
43	.0304	.0037	.0023	78	.0000	.0000	.0578
44	.0282	.0038	.0026	79	.0000	.0000	.0631
45	.0260	.0041	.0028	80	.0000	.0000	.0686
46	.0237	.0043	.0031	81	.0000	.0000	.0746
47	.0214	.0046	.0034	82	.0000	.0000	.0813
48	.0191	.0049	.0038	85	.0000	.0000	.1043
49	.0167	.0053	.0042	90	.0000	.0000	.1551
50	.0143	.0057	.0046	95	.0000	.0000	.2330
51	.0118	.0062	.0051	100	.0000	.0000	.3495
52	.0092	.0068	.0056	105	.0000	.0000	.5243

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ACTUARIAL ASSUMPTIONS (Continued)

Actuarial Status

Actuarial status is measured by comparing the value of the assets of the plan with the value of prospective payments to be made from the plan and determining the value of future contributions necessary to obtain actuarial balance of the plan. This may be expressed in an equation as follows:

Value of Prospective Payments from the Plan	less	Value of Assets of the Plan	equals	Value of Future Contributions

The value of prospective payments from the plan is called the present value of benefits in actuarial terminology. This value is determined by considering the provisions of the plan and known past and current personnel information, such as number of employees, their ages, and their compensation. To determine how many of these employees will become eligible for benefits in the future, what benefits will be paid, and how long benefits will be paid, it is necessary to make some forecasts, called actuarial assumptions, as to when people will retire, who will die and leave before retirement, how long people will live after retirement, etc. Actuarial assumptions are made on the basis of past experience, both specific and general, and expected trends.

The value of assets of the plan is essentially a financial valuation. Certain types of assets may be valued on different bases. For example, common stocks might be valued at market, at cost, or on some other basis.

Actuarial Method

Valuations of the plan use the Entry Age Normal Cost Method of allocating future contributions into portions attributable to past and to current and future employment of employees.

Under this actuarial method, the value of future contributions attributable to current and future employment of employees is first determined. This is called present value of future normal costs or present value of future annual costs. The following steps indicate how this is determined for benefits expected to be paid upon normal retirement.

- Expected pension benefit at normal retirement is determined for each employee.

- The normal cost or annual cost is determined for each employee computed as a level percentage of his pay and assuming that such percentage of pay is paid from the employee's entry age into employment to his normal retirement. This annual cost is determined so that its accumulated value at normal retirement is sufficient to provide the expected pension benefits. (The sum of the annual costs for all employees determines the annual cost of the plan.)

- The value of future payments of annual cost is determined for each employee, based on the number of years with the Association to normal retirement date.

- The sum of such values for all employees determines the present value of future annual costs.

In general, the calculations for any disability benefits, vested termination benefits and death benefits follow the above procedure taking into consideration that there is no single time at which the employee is entitled to the benefits. Rather, each age prior to normal retirement has associated with it appropriate probabilities of disability, termination, and death.

The portion of the present value of future benefits which is not covered by future annual costs is called the accrued liability. It is the amount to which past annual costs would have accumulated had they been paid each year in the employee's career and had all assumptions been realized. The unfunded accrued liability is thus equal to the accrued liability less the accumulated assets.

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