

Report of
AN ACTUARIAL VALUATION
December 31, 1980
CITY OF CROOKSTON
FIRE DEPARTMENT RELIEF ASSOCIATION
Crookston, Minnesota

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STATE OF MINNESOTA

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GABRIEL, ROEDER, SMITH & COMPANY
ACTUARIES & CONSULTANTS

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June 9, 1981

City of Crookston
Fire Department Relief Association
Crookston, Minnesota

Submitted in this report are the results of the December 31, 1980 actuarial valuation of the assets, actuarial values, and contribution requirements associated with the benefits provided by the Crookston Fire Department Relief Association.

The valuation results contained in Section A provide the actuarial information needed to determine the employer's "minimum obligation" effective January 1, 1982. Section A also contains comments regarding the valuation results.

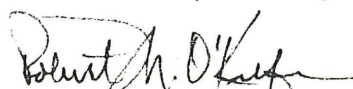
The valuation was based upon information furnished by the association concerning benefits, financial transactions, active members, terminated members, retirants and beneficiaries. Data was checked for internal and year to year consistency but was not otherwise audited by us. This information is summarized in Section B.


A description of the actuarial funding method and the risk experience assumptions used is contained in Section C. The economic risk experience assumptions as well as the actuarial funding method to be used are established by state law.

Information needed to comply with Statement of Financial Accounting Standards 35 is contained in Section D.

The actuarial valuation was prepared using generally accepted actuarial principles and practices based upon the methods, assumptions, summary of plan provisions and the member and financial data described in this report.

Respectfully submitted,


Robert M. O'Keefe


Gary W. Findlay

SECTION A
RESULTS OF THE VALUATION

COMMENTS

Recent State Legislation

Legislation enacted in 1980 by the State of Minnesota resulted in significant changes effecting every Minnesota local police and salaried firefighters relief association.

These changes can be briefly summarized as follows:

1. All local relief associations were required to phase out by placing all police and fire employees hired after June 15, 1980 into the Minnesota PERA - Police and Fire Fund unless the respective city elected to retain the local fund.
2. All local relief associations (regardless of whether they phase out or not) must amortize (fund) their unfunded accrued liability by December 31, 2010.
3. All cities with local relief associations which did phase out and which comply with the Financial Guidelines Act are entitled to participate in a state amortization aid program.
4. All current active members, of local relief associations which did phase out, were eligible to receive a benefit improvement.
5. Active member contributions are to be 8.0% in 1982 and later unless a higher rate is otherwise specified.

Funding Method Modification

The funding method used in preparing this valuation was the same as was used in your previous report, with the following exception: In the initial report, the cost of disability and death benefits was determined using a one year term cost method. In this report, these costs were determined using the entry age normal cost method. This

was an increase in the contribution of 0.21% of payroll plus \$767. This change increased the unfunded accrued liabilities \$11,909.

Financing Unfunded Accrued Liabilities

As was mentioned earlier, the 1980 change in the law requires that the unfunded accrued liability of each relief association be funded by December 31, 2010. (See Appendix II for a description of unfunded accrued liabilities.) The previous requirement for your plan was for amortization of the unfunded accrued liability by December 31, 2007. The result of this change alone was a decrease in the contribution of \$195.

Status of Plan

The City Council of Crookston, Minnesota passed a resolution to retain the Crookston Fire Department Relief Association as an open plan (an open plan continues to admit new hires to its membership). As a result, the Association will not receive state amortization aid.

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

CONTRIBUTION RATE TO PROVIDE BENEFITS

Member portion & Employer portion

Effective January 1, 1982

<u>Contributions for</u>	<u>If Paid Equally Throughout Year</u>		
	<u>% of Active</u>	<u>Payroll for 1982</u>	<u>+ U.A.L Dollars</u>
Normal cost of annuities:			
Age & service: to members	10.23%		
Age & service: to survivors	1.91		
Disability	3.07		
Death before retirement	2.82		
Refunds of member contributions	0.29		
Total Normal Cost	18.32%		
Amortization of unfunded accrued liabilities (UAL) (29 year level dollar payment)			
Retired lives			\$ 0
Active members			3,390
Total			3,390
Total Cost of Benefits	18.32%	+	\$3,390
Member contributions	8.00%		
COMPUTED EMPLOYER RATE:			
(a) If Paid Equally Throughout Year	10.32%	+	\$3,390
(b) IF PAID AT CALENDAR YEAR END	10.58%	+	\$3,474

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Present Actuarial Condition

The Association accrued actuarial assets were in excess of \$360 thousand on December 31, 1980 -- a considerable sum of money if unencumbered and allocated among a small group of persons. This is not the case with Association assets.

The following schedule puts the \$360 thousand into perspective by showing the relationship between accrued assets, accrued liabilities, and the number of persons with actual and potential claims on the Association's assets.

	Accrued Actuarial Assets	Accrued Liabilities	Unfunded Accrued Liabilities	% Funded
Retirants and Beneficiaries				
Retired Members (15)		\$206,467		
Surviving Spouse (2)		32,476		
Surviving Children (0)		0		
Total (17)	\$238,943	\$238,943	\$ 0	100.0%
Deferred Members (0)				
Active Members (33)	124,162	176,769	52,607	70.2
Totals	\$363,105	\$415,712	\$52,607	87.3%

Accrued liabilities represent the value, computed as of December 31, 1980 of:

- (i) retirement allowances likely to be paid the 17 retirants and beneficiaries;
and
- (ii) the contributions assumed to have been made for the 33 active members
from their entry into the plan until December 31, 1980.

To illustrate, the value of retirement allowances likely to be paid the 17 retirants and beneficiaries -- discounted for investment earnings and mortality -- was computed to be \$238,943 as of December 31, 1980. This means that if the 17 retirants and beneficiaries live and die according to the assumed mortality and if the \$238,943 can be invested to yield an average annual return of 5.0 percent over the remaining lifetimes of the 17 retirants and beneficiaries, then the \$238,943 together with investment earnings thereon will just be sufficient to pay the 17 retirants and beneficiaries their allowances for their remaining lifetimes.

With respect to active members, the accrued liability of \$176,769 represents the amount that would have been accumulated by December 31, 1980 if the normal cost (which is expressed as a level percentage of pay) had been contributed from the date of hire until December 31, 1980 for each of the 33 actives, if these amounts had earned 5.0% interest and if the members in the past had lived, died, withdrawn, retired and received salary increases according to the actuarial assumptions shown in this report.

Historical Funding Ratio Schedule
(\$ in thousands)

<u>Valuation Date December 31</u>	<u>Accrued Liabilities</u>	<u>Accrued Assets</u>	<u>Percent Funded</u>
1978	\$322	\$313	97.2%
1980	416	363	87.3

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION
CONTRIBUTION FOR CALENDAR YEAR EFFECTIVE JANUARY 1, 1982

For any period of time the percent-of-payroll contribution rate is converted to dollars. The amount of dollars for any calendar year depends upon the results of the last actuarial valuation, and upon the timing of contributions within the year. The later the contribution date, the greater the dollar amount will be.

The municipality's dollar contribution for the year may be determined as follows:

(1) Estimated covered payroll for 1982	\$	_____
(2) Total normal cost % from page A-3	18.32 %	_____
(3) Total normal cost (Line 1 times line 2)	\$	_____
(4) Amortization payment on UAL from page A-3		3,390
(5) Total contributions required (Line 3 plus line 4)		_____
(6) Employee contributions (Line 1 times 8%)	\$	_____
(7) State amortization aid	0*	_____
(8) Estimated insurance premium aid		_____
(9) Total of line 6 plus line 7 plus line 8		_____
(10) Employer's Minimum Obligation if payment is made in equal installments throughout the year. (Line 5 minus line 9)	\$	_____
(11) EMPLOYER'S MINIMUM OBLIGATION IF PAYMENT IS MADE AT YEAR END (Line 10 times 1.0247)	\$	_____

* See comment on page A-2 "Status of Plan".

SECTION B
VALUATION DATA
AND
SUMMARY OF BENEFIT PROVISIONS

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Full-Time Firemen

Retirants and Beneficiaries December 31, 1980

By Type of Annuity Being Paid

<u>Type of Annuity Being Paid</u>	<u>No.</u>	<u>Monthly Amounts</u>	<u>Computed Accrued Liabilities</u>
Retirants receiving:			
Age & Service	3	\$1,501.50	\$176,720
Disability	<u>0</u>	<u>0</u>	<u>0</u>
Totals	3	1,501.50	176,720
Beneficiaries receiving:			
Spouse	2	296.50	32,476
Child	<u>0</u>	<u>0</u>	<u>0</u>
Totals	2	296.50	32,476
Deferred Annuity	<u>0</u>	<u>0</u>	<u>0</u>
Totals	5	\$1,798.00	\$209,196

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Volunteers

Retirants and Beneficiaries December 31, 1980

By Type of Annuity Being Paid

<u>Type of Annuity Being Paid</u>	<u>No.</u>	<u>Monthly Amounts</u>	<u>Computed Accrued Liabilities</u>
Retirants receiving:			
Age & Service	12	\$296.00	\$29,747
Disability	<u>0</u>	<u>0</u>	<u>0</u>
Totals	12	296.00	29,747
Beneficiaries receiving:			
Spouse	0	0	0
Child	<u>0</u>	<u>0</u>	<u>0</u>
Totals	0	0	0
Deferred Annuity	0	0	0
	<u>—</u>	<u>—</u>	<u>—</u>
Totals	12	\$296.00	\$29,747

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION
Retirants and Beneficiaries December 31, 1980
By Attained Ages

Attained Ages	Number		
	Age & Service Retirants	<u>Disability</u>	<u>Death Before Retirement</u>
55-59	4		
60-64	2		
65-69	5		
70-74	1		
75-79	2		
80-84	2		
85-89	<u>1</u>		
Totals	17		

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Retirants and Beneficiaries Added to and Removed from Rolls

Comparative Statement

Valuation Date December 31	No. Added to Rolls	No. Removed from Rolls	Rolls End of Year		% Incr. in Annual Allowances	Average Allowances	Discounted Value of Allowances	
			No.	Annual Allowances			Total	Average
1978			16	\$11,466		\$ 717	\$104,892	\$ 6,556
1979	2	1	17	25,128	119%	1,478	246,398	14,494
1980	0	0	17	25,128	0	1,478	238,943	14,055

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

FULL-TIME FIREMEN

Active Members December 31, 1980

Tabulated by Attained Age Groups and Years of Accrued Service

Attained Age Groups	<u>0-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30 Plus</u>	Total No.
25-29	1							1
30-34	2							2
35-39		2						2
40-44	1	1						2
60	<u>—</u>	<u>—</u>	<u>1</u>					<u>1</u>
Totals	4	3	1					8

Average age: 39.3 years.

Average accrued service: 5.5 years.

Valuation payroll: \$145,186.

There are no inactive members entitled to a deferred annuity.

The active member, retirant, and beneficiary data included in the valuation is shown in groups or summaries for reading convenience. Financial calculations were made individually for each covered person.

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

VOLUNTEER FIREMEN

Active Members December 31, 1980

Tabulated by Attained Age Groups and Years of Accrued Service

Attained Age Groups	<u>0-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30 Plus</u>	Total No.
20-24	3	1						4
25-29	4	1						5
30-34	2	2						4
35-39		2	3					5
40-44			2					2
45-49			1					1
50-54			2					2
62				1				1
60				1				1
Totals	9	6	8	2				25

Average age: 36.4 years.

Average accrued service: 7.8 years.

Valuation payroll: \$0.

There are no inactive members entitled to a deferred annuity.

The active member, retirant, and beneficiary data included in the valuation is shown in groups or summaries for reading convenience. Financial calculations were made individually for each covered person.

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Comparative Schedule

Of Active Members

FULL-TIME FIREMEN

Valuation Date December 31	Active Members	Valuation Payroll	Average			
			Age	Service	Pay	% Incr.
1978	8	\$105,984	45.1 yrs.	9.0 yrs.	\$13,248	
1979	8	118,194	38.3	4.5	14,774	11.5%
1980	8	145,186	39.3	5.5	18,148	22.8

VOLUNTEERS

1978	26	\$ N/A	35.3 yrs.	6.5 yrs.	\$ N/A	
1979	24	N/A	36.4	7.3	N/A	N/A
1980	25	N/A	36.4	7.8	N/A	N/A

Crookston Fire Department Relief Association

Brief Summary (12/31/80) of Benefit Provisions Evaluated and/or Considered

Full Time

Age & Service Retirement

Eligibility. 20 years of service and 60 years of age.

Amount. 50% of final salary.

Disability Retirement

Eligibility. Disabled as a result of duty to the extent that unable to perform duties of firefighter prior to eligibility for age & service retirement.

Amount. 50% of final salary offset by the amount of worker's compensation being received.

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

Eligibility.

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

Child. Younger than age 18.

Amount.

Spouse. The greater of \$900 per year or 50% of earned retirement benefit at date of death.

Child. \$180 per child per year.

Maximum Family Benefit. \$1,260 per year if spouse is living or \$1,080 per year if spouse is deceased. (Survivor benefits are offset by the amount of worker's compensation being received.) In addition there is a \$500 lump sum payment for duty related death or a \$100 lump sum payment for non-duty related death.

Vested Deferred. 20 years of service and separated before age 60. Payment beginning is deferred to attainment of age 60.

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

Volunteers

Age & Service Retirement

Eligibility. 20 years of service and 55 years of age.

Amount. For first 20 years of service \$240 per year. For each year in excess of 20 an additional \$24 per year is added up to a maximum of \$480 per year.

Disability Retirement

Eligibility. Same as full time.

Amount. (1) Total Disability. \$25 per week for 12 weeks and \$15 per month thereafter.

(2) Partial Disability. \$15 per week for 12 weeks.

Disability benefits are offset by the amount of worker's compensation being received.

Death Benefits

(1) Duty Related. Lump sum payment of \$500.

(2) Non-Duty Related. Lump sum payment of \$100 plus \$100 for each year of service over 20 years up to a maximum of \$600.

Vested Deferred. 20 years of service and separated before age 55. Payment beginning is deferred to attainment of age 55.

Member Contributions. None.

SECTION C

VALUATION METHODS AND ASSUMPTIONS

CROOKSTON FIRE DEPARTMENT 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 Ages	Single Life Values: Present Value of \$1 Monthly				Future Life Expectancy (Years)	
	Level		Increasing			
	For Life		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 62, or attained age if older.

Sample Rates of Separation From Active Employment Before Retirement, Death or Disability

Sample Ages	% of Active Members 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

<u>Sample Ages</u>	<u>Present Pay Resulting in Pay of \$1,000 at Age 60</u>	<u>Percent Increase in Pay 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 Ages</u>	<u>% of Active Members Becoming 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

SECTION D
ACCUMULATED PLAN BENEFITS

CROOKSTON FIRE DEPARTMENT RELIEF ASSOCIATION

Statement of the Present Value of Accumulated Plan Benefits

December 31, 1980

Actuarial Present Value of
Accumulated Plan Benefits

Vested Benefits:

Participants currently receiving payments	\$209,442
Other participants	94,460
Total Vested Benefits	<u>303,902</u>

Non-Vested Benefits	<u>85,060</u>
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Total Actuarial Present Value of Accumulated Plan Benefits	\$388,962
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The accompanying notes are an integral part of the Statement of the Present Value of Accumulated Plan Benefits.

1. The actuarial present value of accumulated plan benefits presented in this statement was determined using the following assumptions:
 - a. Future salary increases prior to retirement were not considered for active members.
 - b. Future service was considered only to the extent that it would permit active plan participants to become eligible for benefits attributable to service rendered prior to the date of determination.
 - c. Regular valuation assumptions were used as to mortality, withdrawal, retirement ages, and disability.
 - d. Investment return was assumed to be at the rate of 7% compounded annually.
 - e. Salary increase related post retirement benefit adjustments were assumed to be at the rate of 5 1/2% compounded annually unless a lower rate is specified by law.
2. The calculation of the actuarial present value of accumulated plan benefits was made because of the requirements of the Financial Accounting Standards Board. Comparison of this value with plan assets is not indicative of the future ability of the plan to pay benefits when due or of their security in a termination situation.

Calculation of contribution requirements and related benefit value information in a "going concern" environment according to the principles of level cost financing is made by the annual actuarial valuations. The results of the contribution rate calculations cannot be simply replaced by the accumulated plan benefit results. To do so will mislead.

APPENDICES

APPENDIX I

FINANCIAL PRINCIPLES AND OPERATIONAL TECHNIQUES

Promises Made, and Eventually Paid. As each year is completed, the plan in effect hands an "IOU" to each member then acquiring a year of service credit -- the "IOU" says: "The Pension Plan owes you a portion of your retirement benefits, payments to be made in cash, commencing when you qualify for retirement."

The related key financial questions are:

Which generation of taxpayers contributes the money to cover the IOU?

The present taxpayers, who receive the benefit of the member's present year of service?

Or the future taxpayers, who happen to be in town paying taxes at the later time when the IOU becomes a cash demand?

A sound principle of sound retirement plan financing is to have this year's taxpayers contribute the money to cover the IOUs being handed out this year. By following this principle, THE CONTRIBUTION RATE WILL REMAIN APPROXIMATELY LEVEL FROM GENERATION TO GENERATION -- our children and grandchildren will contribute the same percents of active payroll we contribute now.

Funding Method. A funding method is the long-term, planned pattern for employer contributions.

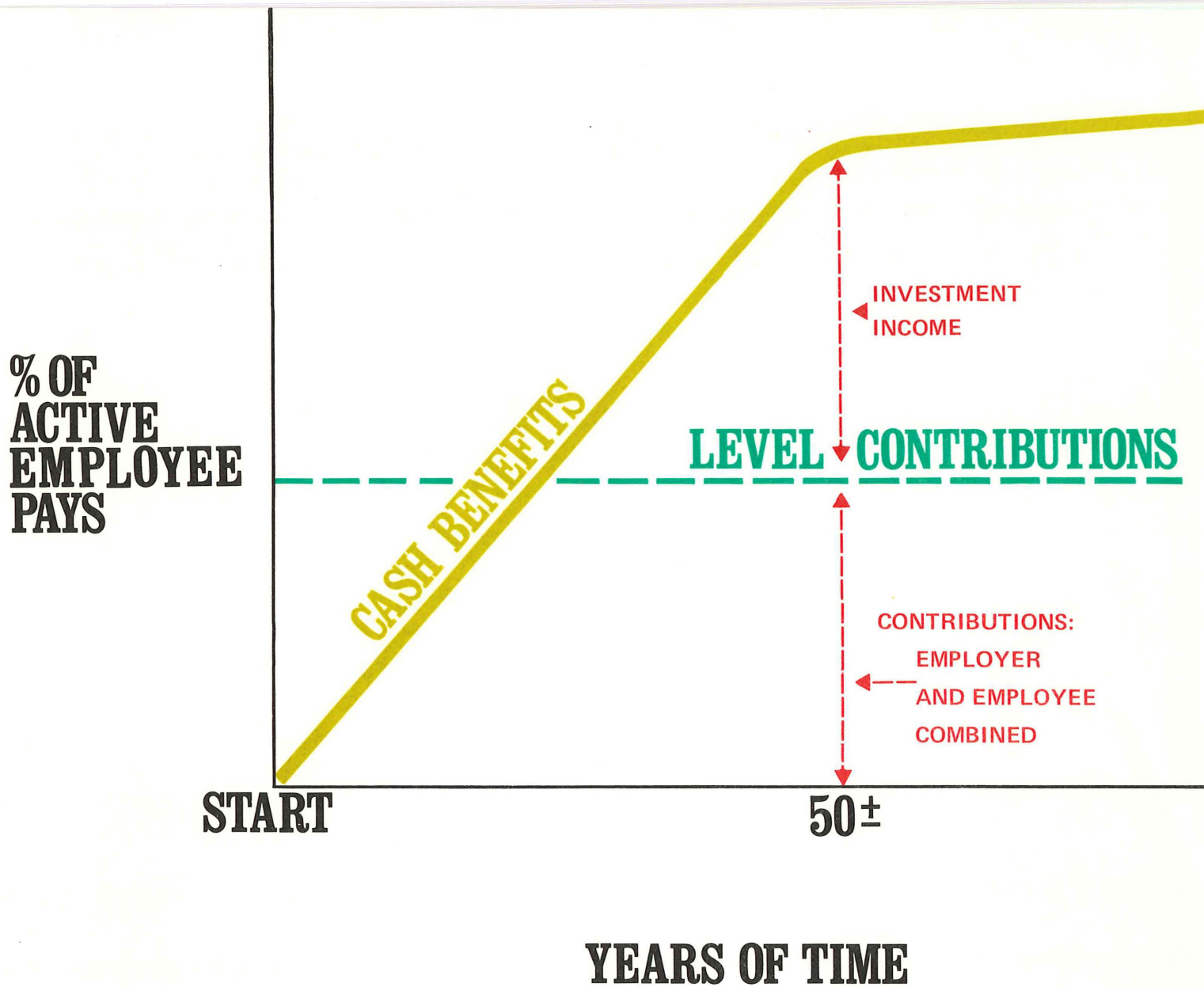
For an open plan (a plan covering future employees), the level-percent-of-active member payroll funding method is the basic funding method.

Computing Contributions to Support Plan Benefits. From a given schedule of benefits and from the employee data and asset data furnished him, the actuary determines the contribution rates to support the benefits by means of an actuarial valuation and a funding method.

In making an actuarial valuation, assumptions must be made regarding anticipated financial experiences for the next year and for decades in the future. Only the subsequent actual experience of the plan can indicate the degree of accuracy of the assumptions.

Reconciling Differences Between Assumed Experience and Actual Experience. Once actual experience has occurred and been observed, it will not coincide exactly with assumed experience, regardless of the wisdom of the assumptions or the skill of the actuary and the millions of calculations he made. The future can be predicted with considerable but not 100% precision, except for inflation which seems to defy reliable prediction.

A well managed plan copes with these continually changing differences by having periodic actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is continuing adjustment in financial position.



CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

LEVEL CONTRIBUTION LINE. Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

- Rates of withdrawal of active members (turnover);
- Rates of mortality;
- Rates of disability;
- Ages at actual retirement;
- Rates of pay increase;
- Investment income;
- Change in active member group size.

APPENDIX II
MEANING OF UNFUNDED ACCRUED LIABILITIES

Almost every pension plan (public or private) has "unfunded accrued liabilities", so whatever they are, they aren't rare. Since the term is not part of everyday conversation, it needs some definition.

"Accrued liabilities" are the present value \$ of plan promises to pay benefits in the future based upon service already rendered - - - a liability has been established ("accrued") because the service has been rendered, but the resulting monthly cash benefit may not be payable until years in the future. Accrued liabilities \$ are the result of complex mathematical calculations, which are made by the plan's actuary (which is the name given to the specialist who makes such calculations).

If "accrued liabilities" at any time exceed the plan's accrued assets (cash & investments), the difference is "unfunded accrued liabilities". This is the common condition. If the plan's assets equalled the plan's "accrued liabilities", the plan would be termed "fully funded". This is a rare condition.

Each time a plan adds a new benefit which applies to service already rendered, an "accrued liability" is created, which is also an "unfunded accrued liability" because the plan can't print instant cash to cover the accrued liability. Payment for such unfunded accrued liabilities is spread over a period of years, commonly in the 20-40 year range.

Unfunded accrued liabilities can occur in another way: If actual financial experience is less favorable than assumed financial experience, the difference is added to unfunded accrued liabilities. In plans where plan benefits are directly related to an employee's pay near time of retirement (a common plan provision) rather than his average pay throughout his working career, unfunded accrued liabilities have been increasing in recent years because unexpected rates of pay increase have created additional accrued liabilities which could not be matched by reasonable investment results. Some of these unexpected pay increases are the direct result of inflation, which is a very destructive force on financial stability.

The existence of unfunded accrued liabilities is not bad, then (any more than a mortgage on your house is "bad"), but the changes from year to year in amount of unfunded accrued liabilities are important - - - "bad" or "good" or somewhere in between.

Nor are unfunded accrued liabilities a bill payable immediately (your food costs are payable immediately), but it is important that policy-makers prevent the amount from becoming unreasonably high and it is vital that your plan have a sound method for making payments toward them so that they are controlled.

The existence of large amounts of unfunded accrued liabilities indicates that total contributions in past years were less than level - - - an almost certain history if retired life liabilities are not fully funded now.