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THE FARMINGTON, WEST VIRGINIA MINE DISASTER: AN ACTUARIAL ANALYSIS OF SURVIVOR BENEFITS PAYABLE

By Charles R. Owen
Office of the Actuary—Baltimore

One of the basic functions of the Old-Age, Survivors, and Disability Insurance program is to provide benefits to the survivors of deceased covered workers. The importance of such benefits is vividly illustrated when an area suffers a major disaster, such as the explosions and fires that occurred in a coal mine near Farmington, West Virginia on November 20, 1968. What the benefits will mean in financial terms to the survivors of this disaster is shown in the following actuarial analysis of the benefits awarded. In summary, about $3 million in benefits will be paid over the future to the survivors.

As a result of the mine disaster, 78 men lost their lives. Their bodies were entombed inside the mine when it was sealed on November 30, 1968. All of the deceased had enough quarters of coverage to have survivors insurance protection. The ages of the deceased ranged from 19 to 65.

Benefits Payable

Out of the 78 deceased men, 53 left survivors who qualified for monthly benefits and lump-sum death payments, 20 left survivors who qualified for lump-sums only, and 1 left survivors who qualified for monthly benefits only. In the case where the survivors qualified for monthly benefits only, and for the 4 remaining deceased who left no qualified survivors, there was no lump-sum paid. When a deceased insured person is not survived by an eligible spouse, the law provides that the lump-sum death payment shall be available only to the extent that burial expenses are actually paid—and, to date, there were no burial expenses in these cases.

All but one of the 74 deceased men who left qualified survivors were survived by widows. Among the 73 surviving widows, 49 had at least one child under age 18 in their care and one was expecting her first child. Of the remaining 23 widows, one widow, aged 59, was disabled and qualified for benefits under the provision of the 1967 Amendments that provides benefits, reduced according to age at entitlement, to disabled widows aged 50-59. The age distribution of the widows, as of the end of November 1968, is shown in the following table:

Age of widow	Number of widows: Total	Number of widows: With children under 18 in their care
Total	73	50
19-29	12	10
30-39	20	20
40-49	27	14
50-59	14	6

The average age of the widows at the time of the disaster was 40 years. Those with children in their care will be eligible to receive monthly benefits until their youngest child attains age 18, or longer if a child becomes disabled before age 18 and continues to live, unless the widow remarries. Upon attainment of age 60, a widow may be eligible for an aged widow's benefit.

There were 128 children qualifying for monthly benefits as a result of the disaster. Of this number, 121 were under age 18 (including 3 posthumous children—one born in

December 1968 and two expected to be born thereafter) and 7 were student children aged 18-20. On the average, there were 2.5 child beneficiaries per family for families in which there was at least one child awarded a monthly benefit. The age distribution of these children, as of the end of November 1968, is as follows:

Age of child	Number of children
Total	128
0-4 [1]	29
5-9	28
10-14	34
15-17	30
18-20	7

[1] Includes 3 posthumous children.

One worker left a 78-year old mother who qualified for monthly benefits, amounting to $133.40, as an aged dependent parent. At the time of the disaster, this parent was receiving a $40 monthly benefit under the provision for benefit payments to certain noninsured persons aged 72 and over. When the parent's monthly benefit of $133.40 began, effective for November 1968, the $40 monthly payment was discontinued.

Lump-sum death payments, all at the $255 maximum, were made on behalf of the 73 deceased workers who were survived by widows. None of the remaining 5 men left a qualified surviving widow, and since no burial expenses were paid, no lump-sum death payment could be made on their behalf.

The amount of family benefits awarded varied, depending on the number of children in the surviving family and on the primary insurance amount of the deceased worker. The distribution of the 54 survivor families with survivors entitled to immediate monthly benefits, was as follows: 50 widows with at least one eligible child under age 18, one disabled widow, one dependent parent, one beneficiary family consisting of 2 surviving children (both under age 18), and one beneficiary family consisting of a student child (the mother of this child is not eligible for monthly benefits, because mother's benefits are not payable solely on the basis of a student child's entitlement to benefits, but she may qualify for an aged widow's benefit upon attainment of age 60). The average primary insurance amount for the 54 workers was $159.40. The monthly amount of family benefits awarded totaled $15,519 (including the benefits that will be awarded upon the birth of the posthumous children) and was distributed as follows:

Monthly amount	Number of families
Total	54
$101.90-$149.90	3
150.00- 199.90	2
200.00- 249.90	16
250.00- 299.90	7
300.00- 349.90	14
350.00- 399.90	10
400.00- 408.00	2

All of the widows may qualify for an aged widow's benefit at age 60.

Valuation of Benefits

In this actuarial analysis of the benefits payable as a result of the disaster, two calculations were made. In one, an estimate was made of the aggregate amount of benefits "expected" to be paid in the future under certain assumptions. Here, no account was taken of the fact that funds not required for the payment of benefits until some future date can be invested at interest. In the second calculation, the "present value" of the aggregate amount "expected" to be paid in the future was determined. By "present value" is meant the lump-sum amount which, if invested at an assumed rate of interest—4¼% was used in these calculations—would be exactly sufficient to finance all "expected" future payments as they arise. Thus, in this instance, the present value may be looked upon as the amount of OASI life insurance in force on the lives of the victims at the time of the disaster.

To illustrate the effect of the school attendance provision, calculations were made on the basis of two assumptions. Under one, no allowance was made for the contingency of full-time school attendance for child beneficiaries attaining age 18 (student child benefits were, however, taken into account in this calculation for the 7 children aged 18-20 in November 1968 and for 1 child who attained age 18 in December, all of whom were awarded student child's benefits). Under the second assumption, full-time school attendance during ages 18-21 was assumed for all child beneficiaries attaining age 18. In both calculations, termination of child's benefits because of mortality or marriage before age 22 was disregarded.

The termination of benefits because of mortality or remarriage was taken into account for the widows. The computations were based on OASDI female mortality and remarriage experience during 1960-62 (except for the disabled widow, for whom mortality only was taken into account—based on termination experience of female disabled-worker beneficiaries under the OASDI system, 1957-63). All benefits were considered, including the deferred monthly benefits payable to aged widows. However, possible entitlement to benefits on the earnings record of the spouse killed in this disaster was disregarded with respect to the possibility of the widow's remarriage after age 60. Also, it was assumed that the widow would not become eligible for benefits based on her own earnings record.

Computations to take into account the termination of the one parent's benefit payable because of mortality were based on female mortality experience in the United States during 1959-61. In valuing the parent's benefit, the monthly rate was reduced from $133.40 to $93.40, since in all likelihood the $40 monthly payment that the parent was receiving at the time of the disaster would have been paid until her death if the worker's life had not been lost in the mine explosion.

Under the above assumptions, the "expected" benefit payments and the present value of these payments to the survivors of the disaster are shown, by survivor family groups, in the following table (in thousands):

Type of group	"Expected" payments		Present value	
	Assuming school attendance	Not assuming school attendance[1]	Assuming school attendance	Not assuming school attendance[1]
All families	$3,137	$2,651	$1,920	$1,609
Surviving widow and one or more children under age 18[2]	2,657	2,181	1,700	1,398
All other family groups	480	470	220	211

[1] School attendance until attainment of age 22 is assumed for the 8 children who were awarded immediate student child's benefits.

[2] Includes deferred aged widow's benefits and the lump-sum death payment.

The average "expected" benefit payments and average present value of these payments are as follows:

Type of group	Average "expected" payment		Average present value	
	Assuming school attendance	Not assuming school attendance[1]	Assuming school attendance	Not assuming school attendance[1]
All families	$42,390	$35,820	$25,950	$21,740
Surviving widow and one or more children under age 18[2]	53,140	43,620	34,010	27,960
All other family groups	20,010	19,560	9,150	8,770

[1] See footnote 1 in preceding table.

[2] See footnote 2 in preceding table.

These figures do not allow for possible withholding of, or reduction in, benefits that would particularly affect widow's and mother's benefits (and to a much lesser extent, child's benefits). However, in cases where the maximum family benefits apply, the withholding of mother's benefits because of the widow's employment could be partially or fully offset by an increase in the child's benefits. The computations are made on the basis of the benefits provided under the 1967 Amendments and do not consider the possible effects of future legislation.

Protection for a Mother-Child Family—Illustrative Example

The amount of insurance protection for a mother-child family depends, in part, on the number of children in the family and on the ages of the beneficiaries. The number of entitled children in each of the 50 mother-child families varied from one to ten. To illustrate the value of insurance protection the program provides for a mother-child family, a family consisting of a widow aged 30 with three children in her care, aged 8, 9, and 10, was chosen. The deceased worker had a primary insurance amount of $152.50, and the total family benefit awarded was $318.40 a month. When the widow attains age 60, if she has not remarried, she will be eligible for an actuarially-reduced aged widow's benefit of $109.20 a month. If she waits until age 62, she will be eligible for an unreduced benefit of $125.90 a month, assuming that she has not become eligible for benefits in her own right based on her own employment (in which case she receives, in effect, the larger of the two benefits).

The "expected" benefit payments and the present value of these payments have been calculated for this family, as they were for the entire group. The same assumptions were applied to this illustrative case. The totals, distributed by type of benefit, are shown in the following table:

Type of benefit	"Expected" payments		Present value	
	Assuming school attendance	Not assuming school attendance	Assuming school attendance	Not assuming school attendance
Total	$56,840	$43,030	$39,505	$30,755
Mother's and child's	48,865	35,055	37,840	29,090
Widow's	7,720	7,720	1,410	1,410
Lump-sum	255	255	255	255