

# Duty Death Assumption

## Overall Summary

### *What is the Duty Death Assumption and how is it Used?*

The Duty Death Assumption represents the likelihood that a member who dies, either during the course of employment or after, will receive certain duty-related death benefits.

Specifically, survivors of active members who suffer a duty-related death receive a one-time lump sum as well as a subsidized survivor annuity.

Survivors of inactive members receive only the one-time lump sum benefit, provided the member died due to an occupational disease or infection that arose out of employment.

The survivor annuity is considered subsidized because it does not require any early retirement reductions. The survivor annuity is further subsidized in the Law Enforcement Officers' and Fire Fighters' Retirement System (LEOFF) and the Washington State Patrol Retirement System (WSPRS) plans because no Joint and Survivor reduction is applied.

The lump sum payment is as follows:

- ◆ \$150,000 for the Public Employees' Retirement System (PERS), the Teachers' Retirement System (TRS), the School Employee's Retirement System (SERS), and the Public Safety Employees' Retirement System (PSERS).
- ◆ \$214,000 for LEOFF and WSPRS, indexed for inflation each year beginning in 2008.

## High Level Takeaways

Data is limited given the infrequent observations. This limits our ability to review all plan assumptions for accuracy. However, observations were less than expected across all plans based on the current assumptions.

We compared total active member duty-deaths versus exposures and found that the data suggested duty-death rates are fairly constant by age. This means the observed duty-death rate for a 50-year-old member was similar to that of a 30-year-old member.

We also compared total active member duty deaths versus all active member deaths and found the data suggested that at younger ages, a higher percentage of deaths are duty related.

We looked at these relationships both with and without public safety to see if public safety members showed a different relationship. While public safety showed higher rates of duty-death, we did not observe anything that made us feel the same relationships did not apply. We plan to continue to review these relationships as more data is gathered.

## Assumptions

All assumptions are consistent with the [2012 Actuarial Valuation Report](#), except the new mortality assumption was used in setting the updated duty death rates. The new mortality assumption is described in the Mortality section of this report.

## General Methodology

We began by reviewing the assumption set in the prior demographic experience study. Given the limited number of observations, our goal was to see if the prior assumption was still reasonable. We then decided that unless we had data to suggest the prior assumption

was not reasonable we would leave the prior assumption in place until more data was gathered.

For information about the prior assumption, please see the Office of the State Actuary's (OSA) [2001-2006 Demographic Experience Study](#), and turn to page 15.

The duty-death assumption was studied in conjunction with the mortality rates documented in this report. For more information on the mortality assumptions and rates please see the **Mortality** section.

The current actuarial valuation assumes a portion of the deaths for LEOFF members on disability will be due to occupational disease. However, the duty-death data provided by the Department of Retirement Systems (DRS) did not list who was disabled at the time of death, nor does it track those who died due to occupational disease. As a result, we are unable to review this portion of the duty-death assumption at this time.

## Data

We began with duty related death data dating back to 1981. Because the lump sum duty-death provisions began in March 1996 for LEOFF plans and July 2003 for the other plans, we excluded data prior to those dates, since it would only capture those duty-deaths that resulted in an annuity payment and not the true incidence of the event.

System	Observations Since 2004
PERS	20
TRS	2
SERS	2
LEOFF*	32 (52)
WSPRS	1

\*LEOFF observations since 2006 and (1996).

## Law changes

### ◆ SHB 2933 (2006 session).

- ▲ Applied to members of LEOFF.
- ▲ This law expanded the lump sum duty death benefit to cover occupational disease.

### ◆ SHB 1266 (2007 session).

- ▲ Applied to all plans.
- ▲ Provided coverage of the lump sum benefit to non-active members if their death is due to occupational disease from their course of employment.

## Results

### Past Experience

The tables on the following page show the ratio of Actual-to-Expected (A/E) observations for the systems with the most events, PERS and LEOFF.

PERS A/E Duty-Deaths			
Year	Lives	Expected	Actual
2004	156,117	4.06	3
2005	157,691	4.1	4
2006	157,109	4.08	0
2007	156,473	4.07	4
2008	159,370	4.14	1
2009	162,771	4.23	2
2010	160,646	4.18	3
2011	157,723	4.1	2
2012	153,686	4	1
<b>Total</b>	<b>1,421,586</b>	<b>36.96</b>	<b>20</b>
	<b>Actual/Expected</b>	<b>0.54</b>	

LEOFF A/E Duty-Deaths			
Year	Lives	Expected	Actual
1996	13,141	4.94	0
1997	13,445	5.06	2
1998	13,750	5.17	2
1999	13,961	5.25	3
2000	14,494	5.45	1
2001	14,670	5.52	2
2002	14,944	5.62	1
2003	15,255	5.74	4
2004	15,647	5.88	2
2005	15,712	5.91	3
2006	15,975	6.01	5
2007	16,379	6.16	3
2008	16,695	6.28	5
2009	17,122	6.44	11
2010	17,388	6.54	4
2011	17,303	6.51	4
2012	17,104	6.43	0
<b>Total</b>	<b>262,985</b>	<b>98.88</b>	<b>52</b>
	<b>Actual/Expected</b>	<b>0.53</b>	

## Methods and Format of Assumptions

We considered alternate formats for the assumptions and, ultimately, decided not to make any changes. For reference, we considered, but did not adopt:

- ◆ **Separate assumptions for police and fire members of LEOFF.**  
Given the similar make-up of the average police and fire members and the same benefit provisions for active duty death benefits, we did not feel a separate assumption was necessary.
- ◆ **Separate assumption for inactive members of non-LEOFF plans.**  
We have only observed four duty-deaths in PERS inactive members since 2004. We will continue to monitor this assumption and review next experience study.

## Best Estimate Duty-Related Death Rates

The following table shows our best estimate duty-related death rates for active members in each system.

System	Previous Rate	New Rate
PERS	0.0026%	0.0018%
TRS	0.0008%	0.0008%
SERS	0.0026%	0.0018%
PSERS	0.0026%	0.0018%
LEOFF	0.0376%	0.0350%
WSPRS	0.0200%	0.0200%

The data from DRS represents recipients of the lump sum duty-death benefit. In addition to that payment, beneficiaries have the option to collect a survivor annuity or elect a return on contributions. We are unable to determine which duty deaths

resulted in an annuity election or a return on contribution election. Therefore the updated assumption removes the 10 percent increase applied to the lump sum take rate since the rates above reflect duty death lump sums paid.

The rate change for PERS yields an actual-to-expected ratio of 0.78 over the time period studied, up from 0.54. We did not feel comfortable relying too heavily on historical experience given the limited data. We will continue to adjust the rate in future studies if experience follows the trend of the previous nine years.

Since LEOFF benefits were expanded in 2006 to include death due to occupational disease, there has been an increase in the incidence of payment for police as well as fire fighters. The new rate for LEOFF relies more on the experience of the most recent six years as an indicator of future experience. Similar to PERS, we end up with an A/E of 0.78 when compared to the experience from 2006-2012, and we will continue to monitor this in future studies.

Due to lack of data, we did not adjust the WSPRS or TRS rates, and continued to set the SERS and PSERS rate to match that of PERS.

We also did not make any changes to the LEOFF plan retiree death rate due to occupational disease due to the limited data.