

Reading: Werner Appendix D: Worker's Compensation
Model: Text Example
Problem Type: Loss Ratio Rate Indication for WC

Werner D (020) - (Example - Problem 1)

Find Calculate the final company rate change using both industry and company data.

Given

information required for step 1 of solution: PROJECTED LOSS COST PREMIUM

effective date: 2023 1 1 (year, month, day)
 rates in effect for 12 months
 policy term: 12 months

AY	industry loss cost premium	annual payroll change	Historical Experience Mod (HEM)
2020	2,770	-0.5%	0.960
2021	3,150	5.0%	0.960
2022	2,610	4.0%	0.860

* loss cost premium is already at CRL (Current Rate Level)

Projected Annual Wage Change (PAWC) 1.0%
 Expected Experience Modification (EEM) 0.930

information required for step 2 of solution: PROJECTED MEDICAL LOSS RATIO

projected medical fee schedule change: 1.0% = fee % change
 projected other medical change: 3.0% = other % change

portion of medical loss subject to fee schedule = m 80.0% use this fee % to calculate a weighted average

AY	Rptd Med Loss	Med Loss LDF to Ult	Med Fee Sched Change	Other Medical Change
2020	1,243	1.000	-13.0%	2.0%
2021	1,411	1.800	-2.0%	1.0%
2022	1,198	2.000	12.0%	2.0%

information required for step 3 of solution: INDUSTRY & COMPANY INDICATED RATE CHANGES

Step 3a indemnity cost loss ratio: 18.0%
 LAE ratio to ult loss: 22.0%

Step 3b V + Q: 28.0%
 expected loss cost difference: 4.0%
 current deviation: 1.880

Here are some notes on STEP 2 of the solution that didn't fit on the solution page:

- (5) = weighted average of (3) and (4) with weights m and (1-m)
- (6) = product of "lower" entries from (5)
- (7) = $m \times (1.0 - \text{med \% change})^{(\text{trend period})} + (1 - m) \times (1.0 - \text{other \% change})^{(\text{trend period})}$
 $= (0.8 \times (1.01)^{1.015} + (0.2) \times (1.03)^{1.015})$
- (8) = (1) x (2) x (6) x (7)
- (9) = (8) / (projected loss cost premium from Step 1b)

Step 1 calculate the projected loss cost premium (WC advisory loss costs)

1a trend period for 'step 2' in '2-step' trending

=	(AAD for latest available year)			to	(AAD of effective period)		
=	2022	7	1	to	2024	1	1
=	1.5000 years						

$$\text{trend factor} = (1 + 1.0\%)^{1.5} = 1.0150$$

1b calculate the 'projected' loss cost premium'

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
	(this is the given information)			factor	expected	experience	projected	
CY	industry loss cost premium	annual payroll change	Hist. Exp. Mod (HEM)	to current wage level	future wage level change	mod factor	loss cost premium	
2020	2,770	-0.5%	0.960	1.0920	1.0150	0.9688	2,974.38	<==== final answers to step 1
2021	3,150	5.0%	0.960	1.0400	1.0150	0.9688	3,221.35	<==== final answers to step 1
2022	2,610	4.0%	0.860	1.0000	1.0150	1.0814	2,864.88	<==== final answers to step 1
							9,060.61	<==== final answers to step 1

$$(4) = (1.0 + (2)\text{NextRow}) \times (4\text{NextRow}) = \text{product of "lower" entries from (2)}$$

$$(5) = \text{trend factor}$$

$$(6) = \text{EEM} / (3) = \text{EEM} / \text{HEM} \quad \text{<==== this is like 'on-leveling' the experience modification}$$

$$(7) = (1) \times (4) \times (5) \times (6)$$

Notes:

- column (4) is similar to 'step 1' in '2-step' trending
- column (5) is similar to 'step 2' in '2-step' trending
- column (6) is similar on-leveling premium except here we're 'on-leveling' the experience modification

Step 2 calculate the projected medical loss ratio

	(this is the given information)				(these are the calculated columns)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
AY	Rptd Med Loss	Med Loss LDF to Ult	Med Fee Sched Change	Other Medical Change	combined effect of medical trends	factor to current med cost level	combined effect of projected trend	projected ultimate medical loss	projected ultimate medical LR
2020	1,243	1.000	-13.0%	2.0%	-10.00%	1.085	1.017	1,371.33	46.10%
2021	1,411	1.800	-2.0%	1.0%	-1.40%	1.100	1.017	2,841.80	88.22%
2022	1,198	2.000	12.0%	2.0%	10.00%	1.000	1.017	2,437.18	85.07%
								6,650.31	73.40%

<==== final answers to step 2

Step 3 calculate the industry and company rate changes

industry indicated rate change

$$= \left(\frac{\text{med LR}}{1 + \text{LAE ratio}} + \frac{\text{indem LR}}{1 + \text{LAE ratio}} \right) \times (1 + \text{LAE ratio}) - 1.0$$

$$= \left(\frac{73.4\%}{1 + 22\%} + \frac{18.0\%}{1 + 22\%} \right) \times (1 + 22\%) - 1.0$$

$$= 11.51\% \quad \text{<==== industry rate change (assumes V+Q = 0)}$$

proposed deviation from industry

$$= (\text{expense \& profit adjustment}) \times (\text{operational adjustment})$$

$$= 1 / (1 - V - Q) \times (1 + \text{expected loss cost difference})$$

$$= 1.4444$$

company indicated rate change

$$= (\text{proposed deviation}) / (\text{current deviation}) \times (1 + \text{industry chg}) - 1.0$$

$$= -14.33\% \quad \text{<==== FINAL ANSWER!!}$$