

# A Technical Roadmap to Expense Allocation Under FAS 123(R)

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*Statement of Financial Accounting Standards No. 123 (revised 2004) ("FAS 123(R)") is the standard that now governs accounting for stock options and other forms of equity compensation (but not plans such as employee stock ownership plans [ESOPs]). This article presents a highly technical and mathematical map for amortizing compensation expense under FAS 123(R) and reconciling for actual vesting experience. We recommend a calculator and lots of patience!*

There are many approaches to recognizing the compensation expense associated with share awards under Statement of Financial Accounting Standards No. 123 (revised 2004) ("FAS 123(R)"). Some companies apply forfeiture rates (pre-vesting) in the aggregate, while others apply forfeiture rates to each individual grant. Many reconcile against actual forfeiture experience on quarterly interim periods, while others reconcile at annual periods or on the vest date. Best practices are continuing to evolve.

However, we believe that it will become best practice to reconcile forfeiture experience *quarterly* based upon *individual* option grants, and therefore any incremental changes in estimates will consistently be re-amortized over the requisite service period during interim pe-

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riods. This approach will lead to less volatile financial statements comparatively against less frequent reconciliations.

The intent of this article is to illustrate a recognition approach that can be a roadmap for companies in amortizing compensation expense as well as reconciling actual forfeiture experience. But before doing so, a company must make decisions regarding the amortization policy as well as the forfeiture rate that is anticipated to occur.

FAS 123(R) allows companies to recognize compensation cost for an award with a graded vesting schedule, either on a straight-line basis for each separately vesting portion (“tranche”) of the award (consistent with Financial Interpretation No. 28 [“FIN 28”]) or on a straight-line basis for the entire award. However, the amount of compensation cost recognized at any date must at least equal the vested portion at that date.<sup>1</sup>

Additionally, companies shall base initial accruals of compensation cost on the estimated number of shares to vest. That estimate shall be revised if subsequent information indicates that the actual number of instruments is likely to differ from previous estimates.<sup>2</sup> We recommend that companies look at historical rates of forfeiture, as well as any other economic and demographic reasons for why the future may differ from the past. One approach to doing so is an actuarial analysis of termination and mortality rates based upon the current demographic profile of option holders. Further, we find that future forfeiture experience is largely affected by the “in-the-moneyness” level of outstanding awards, seasonality, and the remaining time to vest, all of which should be considered in determining a prospective forfeiture rate.

After making these decisions, the next stage is to proceed to the steps below, which illustrate the allocation of compensation expense under FAS 123(R).

## **Step 1: Determining the Expected Awards to Vest**

The first step in the process is determining the expected number of awards to vest. This determination should consider all relevant

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1. Paragraph 42 of FAS 123(R).

2. Paragraph 43 of FAS 123(R).

## Glossary of Symbols and Terms

The following symbols and terms are used in this article:

Term	Symbol	Definition
Measurement date	$MD_i$	Representative of the date at which the expense is being calculated
Grant date	GD	The initial date of grant, the beginning of the requisite service period
Vesting date	$VD^t$	The date at which the awards vest. There may be multiple tranches $t$ , and therefore multiple vest dates in a single award.
Projected to vest	$PV_i^t$	The projected number of awards that will vest for each vesting tranche $t$ at a given measurement date, $i$
Accrued vest	$AV_i^t$	The accrued number of vested awards for each vesting tranche $t$ at a given measurement date, $i$
Cumulative amortization ratio	$CAR_i$	The ratio of expense that needs to be recognized at a given measurement date, $i$
Amortization expense	$AE_i$	The minimum amount of expense that needs to be expensed at a given measurement date, $i$
Current expense	$CE_i$	The amount of expense that needs to be recognized during the current financial reporting period
Unamortized compensation expense	$UCE_i$	The unamortized amount of expense that needs to be recognized subsequent to the measurement date, $i$

characteristics, such as vesting schedules, change in control provisions, retirement eligibility, and other provisions.

Therefore, to calculate the compensation expense at any measurement date (*MD*) at time *i*, the projected awards to vest,  $PV_i$ , must be estimated. Further, the accrued vested shares,  $AV_i$ , at time *i* can be determined. As mentioned earlier and in Paragraph 42 of FAS 123(R), at no time can the expense recognized be less than the accrued number of shares to vest, and therefore  $AV_i$  can be viewed as an expense minimum floor.

Again, this calculation should consider the probability of early vesting for reasons such as retirement eligibility. Therefore, if awards are to vest upon retirement eligibility, and the actual service vesting date (*VD*) is a period later than the retirement eligibility date, then the expected awards to vest should reflect this. It may be necessary to calculate an adjusted vesting date (*VD*) to reflect for an early recognition of vesting provisions. For simplicity purposes, the forthcoming examples do not adjust the vesting date (*VD*) to reflect for any early vesting provisions.

For each vesting tranche *t* at a measurement date (*MD*) *i*,  $PV_i^t$  should be estimated as in equation 1.

$$PV_i^t = \sum_{t=1}^n \left( \text{Number of Options in Tranche } t \times (1 - \text{Forfeiture Rate})^{\frac{\text{Max}(VD^t - MD, 0)}{365.25}} \right)$$

*Equation 1*

(In the cases of daily or monthly vesting, we recommend that the above calculation be simplified to more generalized annual vesting, with vesting occurring mid-year—and therefore reasonably estimate the number of awards to vest.)

Further, it can be ascertained for each vesting tranche *t*, the number of options that are currently vested at *Measurement Date i*,  $AV_i^t$ .

Because different types of individuals may have different expectations of turnover and thus forfeiture rates, we believe that best practice will lead towards calculating  $PV_i^t$  on an individual award basis rather than for the aggregate number of awards.

## Step 2: Expense Recognition

At any measurement date ( $MD$ ) in between the grant date ( $GD$ ) and vesting date ( $VD$ ), the projected required expense can be calculated as the ratio of the days since grant to the requisite vesting period (where  $MD$  after the  $VD$  is 100% recognized, and  $MD$  before the  $GD$  is 0% recognized).

Using a straight-line approach, only the final and terminal vesting date is required to determine the current cumulative amortization ratio ( $CAR$ ) (equation 2).

$$CAR_i = \text{Maximum}(\text{Minimum}\left(\frac{MD_i - GD}{VD_{Max} - GD}\right), 100\%), 0\%)$$

Equation 2

Using a FIN 28 approach, it will be necessary to calculate the  $CAR$  for each respective vesting tranche  $t$  (equation 3).

$$CAR_i = \sum_{t=1}^n \text{Maximum}(\text{Minimum}\left(\frac{MD_i - GD}{VD_t - GD}\right), 100\%), 0\%)$$

Equation 3

Again, in the cases of daily or monthly vesting, we strongly urge the use of a straight-lined recognition policy, or else a company will need to use a simplification technique to estimate the  $CAR$ .

Therefore, regardless of the expense recognition policy (either straight-line or FIN 28) the required amortized expense that needs to be accrued through the measurement date can be expressed as  $AE_i$  (equation 4).

$$AE_i = \text{Maximum} \{ AV_i \times FV, PV_i \times FV \times CAR_i \}$$

Equation 4

Note that under fixed accounting, the fair value,  $FV$ , of an award will not vary as a function of the measurement date  $i$ .

Since  $AE_i$  should represent the entire amortized expense recognized to date, then the current expense for the period,  $CE_i$ , should be offset by any accruals during prior financial reporting periods,  $AE_{i-1}$ , which can be tracked over reporting periods (equation 5).

$$CE_i = AE_i - AE_{i-1}$$

Equation 5

Example 1 below (in Step 3) illustrates the calculation of expense.

### Step 3: Actuarial (Gain)/Loss Analysis as Part of the Reconciliation

We believe that a (gain)/loss analysis that reconciles the prior expense projections to the current period expense is an important aspect of understanding its sensitivity.

At a minimum, a (gain)/loss analysis should incorporate changes due to new options granted into the pool and actual forfeitures compared against projected forfeitures.

To prepare this analysis, first isolate all options that have unrecognized amortization expense as of the end of the prior measurement period,  $UAE_{i-1} \geq 0$ .

Therefore, these options are isolated to those who are being recognized during the duration of the current measurement period.

At measurement date  $i$ , for each grant  $x$ , with fair value,  $FV_x$ , calculate the following (equation 6):

$$\sum_{x=1}^n (PV_i^t - PV_{i-1}^t) \times FV_x \times CAR_i = \Delta \text{ due to forfeiture experience}$$

Equation 6

In example 1, we have laid out examples for the next several reporting periods of applying the concepts for Steps 1 through 3. We have applied a “matrix” of expected forfeiture rates, dependent on both the “in-the-moneyness” and the seasonality effect of forfeiture.

#### Example 1

Example 1 illustrates the recognition of expense. During the January 1, 2007–March 31, 2007 (Q1) fiscal period, Company ABC issued 7,800 options at various grant dates and market prices. All options have four-year graded vesting (25% annually). For purposes of

estimating forfeitures, Company ABC has studied forfeitures and developed dynamic forfeiture rates based upon the “in-the-moneyness” (sometimes described as Share Price / Strike Price or S/K Ratio) level and seasonality as summarized in table 1.

**Table 1**

In-the-Moneyness	Season				Annual Total
	Q1	Q2	Q3	Q4	
>200%+	1.0%	1.0%	1.0%	1.0%	1.0%
175%-200%	2.0%	2.0%	1.5%	1.5%	1.8%
150-175%	3.0%	3.0%	2.0%	2.0%	2.5%
125%-175%	5.0%	5.0%	2.5%	2.5%	3.8%
100%-125%	7.0%	7.0%	3.0%	3.0%	5.0%
<100%	10.0%	10.0%	5.0%	5.0%	7.5%

Company ABC intends to recognize the compensation expense using a straight-line basis. Assuming all options are outstanding as of March 31, 2007, table 2 (see next page) summarizes expense during Q1.

**Expense Recognition for the January 1–March 31 Interim Reporting Period**

To summarize the mathematics of example 1, first we need to calculate the expected number of options to vest as of the measurement date, March 31, 2007. We have illustrated this example for grant 1.

As of March 31, 2007, the first vesting tranche of grant 1 has 276 days until vesting (1 from the first quarter, 91 from the 2nd quarter, 92 from the 3rd quarter, and 92 from the 4th quarter). Since the awards are 210% in-the-money, then all vesting tranches will have a 1% annual rate of forfeiture for each quarter. Therefore the expected number of options can be determined to be 24.81, based on the formula in equation 7.

$$PV_1^1 = \left( \text{Number of Options in Tranche 1} \times (1 - \text{Forfeiture Rate})^{\frac{\text{Max}(TD' - MD, 0)}{365.25}} \right)$$

$$= \left( 25 \text{ options} \times (0.99)^{\frac{1}{365.25}} (0.99)^{\frac{91}{365.25}} (0.99)^{\frac{92}{365.25}} (0.99)^{\frac{92}{365.25}} \right) = 24.81 \text{ options}$$

*Equation 7*

**Table 2**

Assumptions:

Measurement Date: March 31, 2007

Stock Price at March 31, 2007: \$21.00

Name	Options	Strike Price	GD Grant Date	VD Full Vest Date	Fair Value	S/K Ratio	AV <sub>1</sub> Accrued Vest	PV <sub>1</sub> Projected To Vest	Expense Recognition			
									1/1/2007	4/1/2007	7/1/2007	10/1/2007
Grant 1	100	\$10.00	1/1/2007	1/1/2011	\$3.00	210%	0.00	97.76	\$17.87	\$18.27	\$18.47	\$18.47
Grant 2	200	\$11.00	1/2/2007	1/2/2011	\$3.30	191%	0.00	192.34	\$38.23	\$39.54	\$39.97	\$39.97
Grant 3	300	\$12.00	1/3/2007	1/3/2011	\$3.60	175%	0.00	288.50	\$61.85	\$64.69	\$65.40	\$65.40
Grant 4	400	\$13.00	1/4/2007	1/4/2011	\$3.90	162%	0.00	378.36	\$86.86	\$91.91	\$92.92	\$92.92
Grant 5	500	\$14.00	1/5/2007	1/5/2011	\$4.20	150%	0.00	472.92	\$115.56	\$123.72	\$125.08	\$125.08
Grant 6	600	\$15.00	1/6/2007	1/6/2011	\$4.50	140%	0.00	552.40	\$142.92	\$154.83	\$156.53	\$156.53
Grant 7	700	\$16.00	1/7/2007	1/7/2011	\$4.80	131%	0.00	644.39	\$175.72	\$192.66	\$194.77	\$194.77
Grant 8	800	\$17.00	1/8/2007	1/8/2011	\$5.10	124%	0.00	716.56	\$205.11	\$227.62	\$230.12	\$230.12
Grant 9	900	\$18.00	1/9/2007	1/9/2011	\$5.40	117%	0.00	806.00	\$241.30	\$271.10	\$274.07	\$274.07
Grant 10	1,000	\$19.00	1/10/2007	1/10/2011	\$5.70	111%	0.00	895.42	\$279.47	\$317.90	\$321.40	\$321.40
Grant 11	1,100	\$20.00	1/11/2007	1/11/2011	\$6.00	105%	0.00	984.82	\$319.51	\$368.04	\$372.09	\$372.09
Grant 12	1,200	\$21.00	1/12/2007	1/12/2011	\$6.30	100%	0.00	1,074.18	\$361.29	\$421.51	\$426.14	\$426.14
<b>TOTAL</b>	<b>7,800</b>						<b>0.00</b>	<b>7,103.67</b>	<b>\$2,045.70</b>	<b>\$2,291.78</b>	<b>\$2,316.97</b>	<b>\$2,316.97</b>



Using a similar approach for each of the vesting tranches, we arrive at 97.76 options being expected to vest (table 3).

**Table 3**

Vest Date	Days to Vest				Total	Total Options	Expect to Vest
	Q1	Q2	Q3	Q4			
1/1/2008	1	91	92	92	276	25.00	24.81
1/1/2009	92	182	184	184	642	25.00	24.56
1/1/2010	182	273	276	276	1007	25.00	24.32
1/1/2011	272	364	368	368	1372	25.00	24.07
TOTAL						100.00	97.76

Therefore,  $PV_1^T$  at March 31, 2007, is equal to 97.76 for all tranches. Since no options are vested as of March 31, 2007,  $AV_1^T$  is equal to zero.

From grant date to vest date, there are 1,461 days. As of the measurement date of March 31, 2007, 89 days have expired, and therefore the cumulative amortization ratio to date is determined as in equation 8.

$$CAR_1 = \text{Maximum}(\text{Minimum}(\frac{89}{1461}, 100\%), 0\%) = .06091718$$

*Equation 8*

(Please note that if a company is *not* straight-lining, and is instead recognizing expense under FIN 28, then the determination of the cumulative amortization ratio,  $CAR$ , is the only item that will change.)

Therefore as of March 31, 2007, the required amortized expense and the current expense that needs to be recognized is equal to \$17.87 (equations 9 and 10).

$$\begin{aligned} AE_1 &= \text{Maximum} \{ AV_1 \times FV, PV_1 \times FV \times CAR_1 \} \\ &= \text{Maximum} \{ 0 \times \$3.00, 97.76 \times .06091718 \times \$3.00 \} = \$17.87 \end{aligned}$$

*Equation 9*

$$CE_1 = AE_1 - AE_0 = \$17.87 - \$0.00 = \$17.87$$

*Equation 10*

Since no expense has been recognized in prior reporting periods, the entire expense needs to be recognized during Q1.

Following a similar pattern for each of the above grants dictates that as of March 31, 2007, \$2,045.70 should be accrued during Q1.

### Expense Recognition for the April 1–June 30 Interim Reporting Period

Assume that during the 2nd quarter (April 1–June 30), no options have been forfeited, and the stock price as of June 30, 2007 is \$17. Also, note that a new grant occurred on April 2, 2007. A summary of all grants as of June 30, 2007, is as in table 5 (see next page).

Note that the expense recognition for Q1 has not changed, as the amount accrued was fixed.

Again, it is necessary to calculate the expected number of options to vest, given the experience to date. As of June 30, 2007, the first vesting tranche of grant 1 has 185 days until vesting. Therefore the expected number of options can be determined to be 24.74, based on the formula in equation 11.

$$PV_2^1 = \left( \text{Number of Options in Tranche 1} \times (1 - \text{Forfeiture Rate}) \frac{\text{Max}(VD' - MD, 0)}{365.25} \right)$$

$$= \left( 25 \text{ options} \times (0.97)^{\frac{0}{365.25}} \times (0.97)^{\frac{1}{365.25}} \times (0.98)^{\frac{92}{365.25}} \times (0.98)^{\frac{92}{365.25}} \right) = 24.74 \text{ options}$$

#### Equation 11

Using a similar approach for each of the vesting tranches determines that 95.33 options are expected to vest (table 4). (Note that after 3 months of experience, 2.43 *fewer* options are expected to vest, largely due to the stock price decreasing, and therefore increased probabilities of forfeiture.)

**Table 4**

Vest Date	Days to Vest				Total	Total Options	Expect to Vest
	Q1	Q2	Q3	Q4			
1/1/2008	0	1	92	92	185	25.00	24.74
1/1/2009	91	92	184	184	551	25.00	24.13
1/1/2010	181	183	276	276	916	25.00	23.52
1/1/2011	271	274	368	368	1281	25.00	22.94
TOTAL						100.00	95.33

**Table 5**

Assumptions

Measurement Date: June 30, 2007

Stock Price at June 30, 2007: \$17.00

Name	Options	Strike Price	GD Grant Date	VD Full Vest Date	Fair Value	S/K Ratio	AV <sub>t</sub> Accrued Vest	PV <sub>t</sub> Projected To Vest	Expense Recognition					
									1/1/2007	4/1/2007	7/1/2007	10/1/2007	3/31/2007	6/30/2007
Grant 1	100	\$10.00	1/1/2007	1/1/2011	\$3.00	170%	0.00	95.33	\$17.87	\$17.37	\$18.01	\$18.01	\$18.01	\$18.01
Grant 2	200	\$11.00	1/2/2007	1/2/2011	\$3.30	155%	0.00	190.65	\$38.23	\$38.85	\$39.62	\$39.62	\$39.62	\$39.62
Grant 3	300	\$12.00	1/3/2007	1/3/2011	\$3.60	142%	0.00	279.84	\$61.85	\$60.89	\$63.44	\$63.44	\$63.44	\$63.44
Grant 4	400	\$13.00	1/4/2007	1/4/2011	\$3.90	131%	0.00	373.08	\$86.86	\$89.41	\$91.62	\$91.62	\$91.62	\$91.62
Grant 5	500	\$14.00	1/5/2007	1/5/2011	\$4.20	121%	0.00	456.23	\$115.56	\$115.27	\$120.66	\$120.66	\$120.66	\$120.66
Grant 6	600	\$15.00	1/6/2007	1/6/2011	\$4.50	113%	0.00	547.39	\$142.92	\$152.13	\$155.11	\$155.11	\$155.11	\$155.11
Grant 7	700	\$16.00	1/7/2007	1/7/2011	\$4.80	106%	0.00	638.52	\$175.72	\$189.30	\$193.00	\$193.00	\$193.00	\$193.00
Grant 8	800	\$17.00	1/8/2007	1/8/2011	\$5.10	100%	0.00	729.63	\$205.11	\$235.52	\$234.32	\$234.32	\$234.32	\$234.32
Grant 9	900	\$18.00	1/9/2007	1/9/2011	\$5.40	94%	0.00	781.32	\$241.30	\$255.41	\$265.68	\$265.68	\$265.68	\$265.68
Grant 10	1,000	\$19.00	1/10/2007	1/10/2011	\$5.70	89%	0.00	867.94	\$279.47	\$299.57	\$311.53	\$311.53	\$311.53	\$311.53
Grant 11	1,100	\$20.00	1/11/2007	1/11/2011	\$6.00	85%	0.00	954.52	\$319.51	\$346.89	\$360.64	\$360.64	\$360.64	\$360.64
Grant 12	1,200	\$21.00	1/12/2007	1/12/2011	\$6.30	81%	0.00	1,041.06	\$361.29	\$397.38	\$413.01	\$413.01	\$413.01	\$413.01
Grant 13	1,300	\$22.00	4/2/2007	4/2/2011	\$6.60	77%	0.00	1,107.72	\$0.00	\$445.36	\$460.37	\$460.37	\$460.37	\$460.37
<b>TOTAL</b>	<b>9,100</b>						<b>0.00</b>	<b>8,063.24</b>	<b>\$2,045.70</b>	<b>\$2,643.35</b>	<b>\$2,727.02</b>	<b>\$2,727.02</b>	<b>\$2,727.02</b>	<b>\$2,727.02</b>

Therefore,  $PV_2^T$  at 6/30/2007 is equal to 95.33 for all vesting tranches. Since no options are vested as of 6/30/2007, then  $AV_2^T$  is equal to zero.

From grant date to vest date, there are 1,461 days. As of the measurement date of 6/30/2007, 180 days have expired, and therefore the cumulative amortization ratio to date is determined as in equation 12.

$$CAR_2 = \text{Maximum}(\text{Minimum}(\frac{180}{1461}, 100\%), 0\%) = .123203285$$

*Equation 12*

Therefore as of June 30, 2007, the required amortized expense that needs to be recognized is equal to \$35.24 (equation 13).

$$\begin{aligned} AE_2 &= \text{Maximum} \{ AV_2 \times FV, PV_2 \times FV \times CAR_2 \} \\ &= \text{Maximum} \{ 0 \times \$3.00, 95.33 \times .123203285 \times \$3.00 \} = \$35.24 \end{aligned}$$

*Equation 13*

Since during Q1 (see above), \$17.87 was accrued, the current expense required to be recognized is equal to \$17.37 (equation 14).

$$CE_2 = AE_2 - AE_1 = \$35.24 - \$17.87 = \$17.37$$

*Equation 14*

Following a similar pattern for each of the above grants, \$2,643.35 should be accrued during Q2 in the aggregate.

### **Reconciliation of Actual Q2 Expense Against Projected Q2 Expense**

During Q1, it was projected that Q2 expense would be equal to \$2,291.78. As of June 30, 2007, we now see that Q2 expense is equal to \$2,643.35. Why the difference? Following our approach for reconciling changes in expense, we have table 6 (see next page).

Note that an additional \$445.36 of current expense was recognized in Q2 due to a new grant, which was not projected in Q1. Further, a credit of \$93.79 was recognized to reflect for the 148.14 fewer options that are now expected to vest in the aggregate.

**Table 6**

Reconciliation of (Gain)/Loss from Prior Estimate to Current Expense	Period Expense
Prior Period Expense Projection	\$2,291.78
Change due to New Option Entry	\$445.36
Change due to (Gain)/ Loss in Actual Forfeiture Experience	(\$93.79)
New Expense Projection	\$2,643.35

Note the 8,063.24 options expected during Q2 *less* the new grant of 1,107.72 *less* the prior estimate of 7,103.67 (equation 15).

$$8,063.24 - 1,107.72 - 7,103.67 = (148.14)$$

#### Equation 15

To verify this reconciliation, we can look at each grant and compare the prior estimation of vested options compared to the new estimate; note that we have excluded the new grant during Q2 (table 7) (see next page).

Note that table 7 illustrates the original 7,103.67 shares expected to vest on March 31, 2007, the refined estimate of 6,955.53 on June 30, 2007, and the incremental difference of (148.14) options. The total expense required to be recognized over the requisite service period is equal to (\$799.13). However, only (\$93.79) needs to be recognized as of June 30, 2007, and the remaining expense of (\$705.34) is re-amortized and smoothed into the remaining service period.

### Expense Recognition for the July 1–September 30 Interim Reporting Period

Assume that during the 3rd quarter (July 1 to September 30), Grant 6 of 600 options was forfeited, and the stock price as of September 30, 2007, is \$22. A summary of all grants as of September 30, 2007, is given in table 8 (see page after next).

Note that the expense recognition for Q1 and Q2 has not changed, as the amount accrued was fixed.

Again, it is necessary to calculate the expected number of options to vest, given the experience to date. As of September 30, 2007, the first vesting tranche of grant 1 has 93 days until vesting.

**Table 7**

	Estimated		Reconciliation				Alternative Reconciliation			
	Total Options	$PV_2$ 3/31/2007	Estimated $PV_2$ 6/30/2007	Incremental Options	Fair Value	Total Expense	Amortized Expense	Prior $CE_2$	New $CE_2$	Additional Expense
Grant 1	100	97.76	95.33	(2.43)	\$3.00	(\$7.30)	(\$0.90)	\$18.27	\$17.37	(\$0.90)
Grant 2	200	192.34	190.65	(1.70)	\$3.30	(\$5.60)	(\$0.69)	\$39.54	\$38.85	(\$0.69)
Grant 3	300	288.50	279.84	(8.66)	\$3.60	(\$31.19)	(\$3.80)	\$64.69	\$60.89	(\$3.80)
Grant 4	400	378.36	373.08	(5.28)	\$3.90	(\$20.60)	(\$2.50)	\$91.91	\$89.41	(\$2.50)
Grant 5	500	472.92	456.23	(16.70)	\$4.20	(\$70.12)	(\$8.45)	\$123.72	\$115.27	(\$8.45)
Grant 6	600	552.40	547.39	(5.01)	\$4.50	(\$22.53)	(\$2.70)	\$154.83	\$152.13	(\$2.70)
Grant 7	700	644.39	638.52	(5.87)	\$4.80	(\$28.17)	(\$3.36)	\$192.66	\$189.30	(\$3.36)
Grant 8	800	716.56	729.63	13.07	\$5.10	\$66.68	\$7.90	\$227.62	\$235.52	\$7.90
Grant 9	900	806.00	781.32	(24.68)	\$5.40	(\$133.27)	(\$15.69)	\$271.10	\$255.41	(\$15.69)
Grant 10	1,000	895.42	867.94	(27.48)	\$5.70	(\$156.64)	(\$18.33)	\$317.90	\$299.57	(\$18.33)
Grant 11	1,100	984.82	954.52	(30.29)	\$6.00	(\$181.75)	(\$21.15)	\$368.04	\$346.89	(\$21.15)
Grant 12	1,200	1,074.18	1,041.06	(33.12)	\$6.30	(\$208.63)	(\$24.13)	\$421.51	\$397.38	(\$24.13)
TOTAL	7,800	7,103.67	6,955.53	(148.14)		(\$799.13)	(\$93.79)	\$2,291.78	\$2,197.99	(\$93.79)



Therefore, the expected number of options can be determined to be 24.94, based on the formula in equation 16.

$$PV_1^1 = \left( \text{Number of Options in Tranche 1} \times (1 - \text{Forfeiture Rate})^{\frac{\text{Max}(VD' - MD, 0)}{365.25}} \right)$$

$$= \left( 25 \text{ options} \times (0.99)^{\frac{0}{365.25}} \times (0.99)^{\frac{0}{365.25}} \times (0.99)^{\frac{1}{365.25}} \times (0.99)^{\frac{92}{365.25}} \right) = 24.94 \text{ options}$$

*Equation 16*

Using a similar approach for each of the vesting tranches arrives at a result of 98.26 options being expected to vest (table 9). (Note that after three additional months of experience, and given the increase in stock price, an additional 2.93 options are expected to vest.)

**Table 9**

Vest Date	Days to Vest				Total	Total Options	Expect to Vest
	Q1	Q2	Q3	Q4			
1/1/2008	0	0	1	92	93	25.00	24.94
1/1/2009	91	91	93	184	459	25.00	24.69
1/1/2010	181	182	185	276	824	25.00	24.44
1/1/2011	271	273	277	368	1189	25.00	24.20
<b>TOTAL</b>						<b>100.00</b>	<b>98.26</b>

Therefore,  $PV_3^T$  at September 30, 2007, is equal to 98.26 for all vesting tranches. Since no options are vested as of September 30, 2007, then  $AV_3^T$  is equal to zero.

From grant date to vest date, there are 1,461 days. As of the measurement date of September 30, 2007, 272 days have expired, and therefore the cumulative amortization ratio to date is determined as in equation 17.

$$CAR_3 = \text{Maximum}\left(\text{Minimum}\left(\frac{272}{1461}, 100\%\right), 0\%\right) = .1861739$$

*Equation 17*

Therefore as of September 30, 2007, the required amortized expense that needs to be recognized is equal to \$54.88 (equation 18).



$$\begin{aligned}
 AE_3 &= \text{Maximum} \{AV_3 \times FV, PV_3 \times FV \times CAR_3\} \\
 &= \text{Maximum} \{0 \times \$3.00, 98.26 \times .1861739 \times \$3.00\} = \$54.88
 \end{aligned}$$

*Equation 18*

Since during Q1 and Q2 (see above), \$17.87 and \$17.37 were accrued respectively, the current expense required to be recognized is equal to \$19.64 (equation 19).

$$CE_3 = AE_3 - AE_2 = \$54.88 - \$35.24 = \$19.64$$

*Equation 19*

Following a similar pattern for each of the above grants, \$2,634.96 should be accrued during Q3 in the aggregate.

### Reconciliation of Actual Q3 Expense Against Projected Q3 Expense

During Q2, it was projected that Q3 expense would be equal to \$2,727.02. As of September 30, 2007, we now see that Q2 expense was equal to \$2,634.96. Why the difference? Following our approach for reconciling changes in expense, we arrive at table 10.

**Table 10**

Reconciliation of (Gain)/Loss from Prior Estimate to Current Expense	Period Expense
Prior Period Expense Projection	\$2,727.02
Change due to New Option Entry	\$0.00
Change due to (Gain)/ Loss in Actual Forfeiture Experience	(\$92.06)
New Expense Projection	\$2,634.96

Note the reduction in projected expense due to the greater than anticipated forfeitures seen in Q3, seen by the 169.04 fewer options that are now expected to vest in the aggregate (equation 20). (Note the 7,894.20 options were expected during Q3 less the prior estimate of 8,063.24.)

$$7,894.20 - 8,063.24 = (169.04)$$

*Equation 20*

To verify this reconciliation, we can look at each grant and compare the prior estimation of vested options compared to the new estimate (table 11) (see next page).

## Conclusion

By continuing the process of Example 1 for each interim period, companies can continually re-assess the actual forfeiture experience comparatively against their prior assumption, and therefore re-amortize any changes over the remaining requisite service period. By reconciling less frequently than every interim reporting period, some troubling results may occur:

- Shares that have already been forfeited will continue to recognize compensation expense until the point of time that reconciliation occurs. This is most troubling when reconciliation occurs at the vesting date, as that may not occur for several years.
- Expense recognition patterns will be more jagged with less frequent reconciliation, and will have greater probability of material error. Therefore, companies who reconcile their awards more frequently will have expense patterns that are more predictable.
- Amortization would not be applying most up-to-date expectations, such as the “in-the-money” level of outstanding awards, the current remaining time to vest, or the “seasonality” affect of forfeiture experience.
- Companies or audit firms are tasked to assess whether reconciliation should occur on a quarterly basis. Assessing whether a reconciliation should occur involves judgement, and it is equally tasking as actually performing the reconciliation. On the other hand, if a company builds into its financial controls the process of updating for actual experience on an interim basis, it does not require a quarterly assessment of actual experience.

For the above reasons, we believe that quarterly reconciliation of individual option grants will become best practice in the arena of FAS 123(R) amortization and expense recognition.

**Table 11**

	Total Options	Estimated PV <sub>3</sub>		Incremental Options	Fair Value	Reconciliation		Alternative Reconciliation		
		6/30/2007	9/30/2007			Total Expense	Amortized Expense	Prior CE <sub>3</sub>	New CE <sub>3</sub>	Additional Expense
Grant 1	100	95.33	98.26	2.93	\$3.00	\$8.78	\$1.64	\$18.01	\$19.64	\$1.64
Grant 2	200	190.65	196.51	5.86	\$3.30	\$19.35	\$3.59	\$39.62	\$43.21	\$3.59
Grant 3	300	279.84	291.07	11.23	\$3.60	\$40.43	\$7.47	\$63.44	\$70.91	\$7.47
Grant 4	400	373.08	383.20	10.12	\$3.90	\$39.47	\$7.27	\$91.62	\$98.89	\$7.27
Grant 5	500	456.23	478.97	22.74	\$4.20	\$95.52	\$17.52	\$120.66	\$138.18	\$17.52
Grant 6	600	547.39	0.00	(547.39)	\$4.50	(\$2,463.26)	(\$450.16)	\$155.11	(\$295.05)	(\$450.16)
Grant 7	700	638.52	656.90	18.38	\$4.80	\$88.22	\$16.06	\$193.00	\$209.06	\$16.06
Grant 8	800	729.63	750.67	21.04	\$5.10	\$107.28	\$19.46	\$234.32	\$253.78	\$19.46
Grant 9	900	781.32	827.13	45.80	\$5.40	\$247.33	\$44.69	\$265.68	\$310.37	\$44.69
Grant 10	1,000	867.94	918.89	50.95	\$5.70	\$290.39	\$52.27	\$311.53	\$363.81	\$52.27
Grant 11	1,100	954.52	1,010.62	56.10	\$6.00	\$336.60	\$60.36	\$360.64	\$421.00	\$60.36
Grant 12	1,200	1,041.06	1,102.33	61.26	\$6.30	\$385.97	\$68.95	\$413.01	\$481.96	\$68.95
Grant 13	1,300	1,107.72	1,179.65	71.94	\$6.60	\$474.80	\$58.82	\$460.37	\$519.19	\$58.82
<b>TOTAL</b>	<b>9,100</b>	<b>8,063.24</b>	<b>7,894.20</b>	<b>(169.04)</b>		<b>(\$329.13)</b>	<b>(\$92.06)</b>	<b>\$2,727.02</b>	<b>\$2,634.96</b>	<b>(\$92.06)</b>