

## FINANCIAL MODELING: INDUSTRY-SPECIFIC APPLICATIONS, CASE STUDIES AND NEWS

### The Flexibility of TAS-MoSes

Increasingly complex product designs and company practices have made the need to customize actuarial projection software greater than ever. TAS-MoSes provides powerful flexibility to meet those needs.

#### FORMULA CHANGES

You can change any column (results that vary by projection period) or scalar (fixed results). Display a column or scalar in Design view, then right-click and select Add Overlay Formula. This creates an additional formula window that is calculated after the base formula.

Formula overlays use the same coding language as the base system. You can copy/paste the base formula into the formula overlay window, then make changes. You can also set an IF condition to return the base formula result (which is called ms\_base for MoSes base result) in one case, but calculate alternative results for other cases.

Your formulas can use powerful C++ constructions, including FOR or WHILE calculation loops within a column. You do not have to be a programmer to understand or modify formulas. The drop-down list of common C++ expressions assists in adding the desired structure into your formula.

Any numeric variable can be made to be stochastic by multiplying the calculation using the variable by a random value using one of more than 30 probability functions provided by MoSes.

TAS-MoSes formula overlays generally upgrade automatically to each new release since they do not change the base formulas. The option to project with formula overlays turned on or off facilitates testing the effect of your changes.

#### NEW VARIABLES AND FORMULAS

TAS-MoSes allows you to create new variables (e.g., an option to indicate whether mortality is stochastic) or variables varying by plan code such as the option, benefit and charge related to a new feature. (Use one of the user-defined fields on the model point records to vary input by model point.)

These new variables automatically appear on input screens according to the category to which you assign them.

You can also create new columns and scalars. MoSes determines the correct calculation order when your formula overlay use is based on formulas you create.

User-defined reports can include columns you create. Formula dependency tree analysis includes your formula overlay changes. Further, these changes are included in the related drill-down analysis showing calculated values for each column.

Formula overlays preserve calculation speed. Since they are compiled along with the standard application, there is no slowdown as would be experienced with using interpreted code.

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TAS-MoSés offers tremendous capabilities to change and add formulas, dynamically modify input variables and run your customized applications quickly and efficiently.

### The Flexibility of TAS-MoSés (continued from page 1)

#### INPUT FLEXIBILITY

Formula overlays can change the value of input variables. For example, you could create an overlay to adjust the periodic premium per unit based on model point field values. You can overwrite an input variable with a single calculated value or a reference to another table.

The flexibility of variant tables is a major advantage of TAS-MoSés. Selector tables can vary by any single-value variable or scalar relevant to a product type. In many cases, you can even eliminate the need to create custom formulas by taking advantage of variant table functionality.

#### DRAMATIC IMPROVEMENT OVER TAS 9.50

Existing users will recognize the tremendous advantages that TAS-MoSés provides over the CalcuFlex features in TAS 9.50. Here is a “top 10” list:

1. There are no insertion points; you can change any column or scalar.
2. You can copy/paste the base formulas into formula overlays.
3. Your formulas can include calculation loops and other C++ features.
4. You can use probability functions to create stochastic calculations.
5. You can create new variables, which appear on appropriate input screens.
6. You can create new formulas in addition to changing existing ones.
7. New columns you create can be used in user-defined reports.
8. Formula dependency tree analysis includes formula overlay changes.
9. Compiled formula overlays calculate faster than interpreted CalcuFlex code.
10. Flexible variant tables eliminate the need for many formula changes.

Further, existing users will see that TAS-MoSés formulas are easier to understand than TAS 9.50 formulas. Formulas are now separate for each product type. Variables and formulas have been renamed and reorganized to make them easier to understand.

TAS-MoSés offers tremendous capabilities to change and add formulas, dynamically modify input variables and run your customized applications quickly and efficiently, giving your company practical flexibility to meet the demands of today’s marketplace. ■

The Group Expression option is particularly valuable for pricing actuaries, who typically want to split results by various insured characteristics.

## Report Groups in TAS-MoSés

Many TAS 9.50 users split liabilities into several different projections in order to produce separate reports. This article discusses how TAS-MoSés provides the ability to split reports among liability report groups within a single projection.

### CORPORATE- AND PRODUCT-TYPE REPORTS

Corporate submodel reports show results for the whole projection. TAS-MoSés offers product-type reports, in addition to corporate reports, that show results calculated by model point. Corporate results, such as investment income and taxes, are allocated and calculated by model point for this purpose. Universal life reports and traditional life reports are examples of product-type reports.

The advantage is that product-type reports can be split among various report groups. These report groups also apply when viewing model point columns (e.g., the formula dependency tree drill-down analysis provided by MoSés).

### NAMED REPORT GROUPS

You can assign model points to report groups by naming the group for each model point. Simply enter the report group names in the Group field on model point data records.

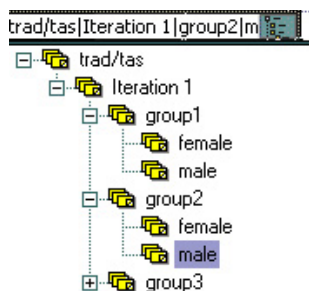
For example, using the names group1, group2, and group3 enables viewing results for one group at a time or, alternatively, for all groups combined, by highlighting the report group tree node for Iteration 1.

Assign a particular model point to its own group for purposes of testing individual calculations within a projection.



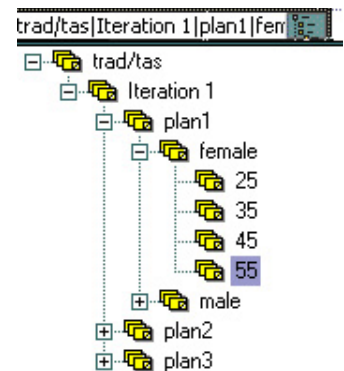
### REPORT GROUP TREES

You can extend this concept to define report groups using a tree structure. For example, using the names group1|male, group1|female, and so on, results in the following report group tree. View results for one group at a time by highlighting the group name as in the example below. Or view results for only males or females within the group by expanding the tree and highlighting the desired branch.



### GROUP EXPRESSION LIST

Alternatively, you can create a report group tree using the fields on model point data records. In the Submodel Options property for the projection, use the Group Expression field to choose which fields to include for the appropriate product submodel. For example, using the fields plan\_code, gender1, and issue\_age1 results in a report group tree similar to the following:



The Group Expression option is particularly valuable for pricing actuaries, who typically want to split results by various insured characteristics.

This new flexibility for splitting reports is a major advantage TAS-MoSés brings to TAS 9.50 users. ■

EPL files save run time by not recalculating liability results and reduce memory requirements by projecting independent model points using seriatim calculations.

## Externally Projected Liabilities in TAS-MoSés

Externally Projected Liability (EPL) files have long been usable in TAS, but only if they were created by TAS projections. Now TAS-MoSés allows you to easily use EPL files to include liability results from other sources.

EPL files save run time by using pre-projected results so fewer calculations are required. Furthermore, using EPL files reduces memory requirements by projecting independent model points using seriatim calculations, where each model point is held in memory while it is being processed and then released, versus holding all model points in memory for the entire projection (see “Using EPLs to Reduce Memory Requirements and Run Times,” *TAS/MoSés Connection* [July 2004]: 2-4).

EPL files created outside of TAS-MoSés enable you to combine other liability results with the liabilities calculated by the current projection. Both types of EPL files can be used at the same time.

EPL files provide results normally calculated by model point. Model point columns are summed by the liab submodel for total corporate results, and by the agg\_gaap submodel for cohort-based GAAP schedules. The liab and agg\_gaap submodels contain formulas to sum over model points, thus adding up the aggregate liability results. This summation process includes EPL files as if they were calculated during the projection.

In TAS 9.50, these files contained several hundred items. TAS-MoSés uses simpler EPL files containing only about 50 to 60 required columns for each product type, plus optional columns that are used to produce product-level reports. For all product types combined, there are just over 100 fields in TAS-MoSés EPL records.

EPL files are simple text files. You produce them by arranging the results in the specified order, using one row for each month in the projection period.

Liability results calculated outside TAS-MoSés are included when an EPL model point specifies the name of an EPL file. The model point record can also specify that the EPL file results should be multiplied by a multiple different from 100%. It also specifies which product type and report group the EPL results belong to.

This new feature makes it practical to include liability results calculated outside the projection. It has been added as part of our work to optimize the TAS-MoSés application for enhanced speed and flexibility. ■

Aliases allows the reuse of tables, and Favorites allows the reuse of selector choices.

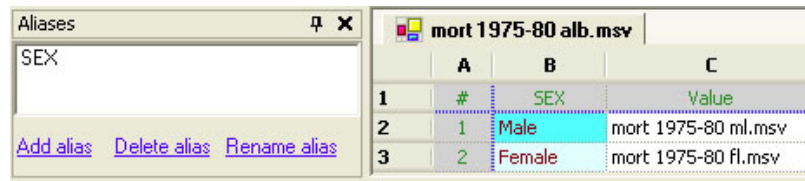
## Variant Table Aliases and Favorites

Aliases and Favorites are two features available in the variant table editor that make it more flexible to use. Aliases allows the reuse of tables, and Favorites allows the reuse of selector choices.

For example, assume that you want to use a common table for both first life and second life inputs. Usually, separate variables exist for each life, such as gender 1 and gender 2, smoking class 1 and smoking class 2, and so forth. Using Aliases, common tables may be set up that work for both first life and second life variables.

Assigning Aliases is a two-step process. Within a selector table, an alias must be created in the Alias panel. Once an alias has been added to a table, it can then be chosen from the list of available selectors (see *Figure 1*).

FIGURE 1

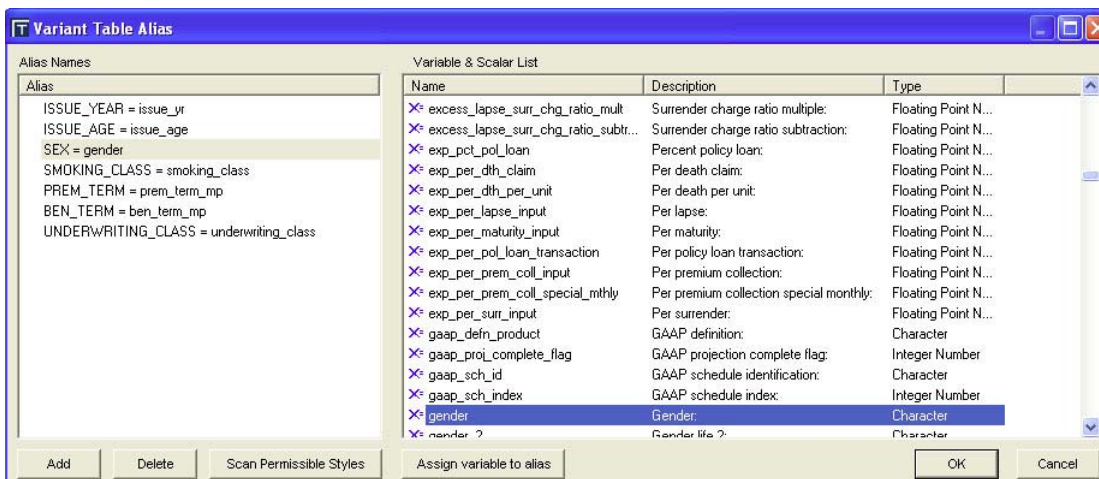


After creating the selector grid using the appropriate aliases and updating the value cells, the table is ready to be used. Navigate to the field where the table is to be used and go to the variant table alias property for that variable. This opens a dialog box where you can add an alias name. You will also see a variable and scalar list that allows you to assign a particular variable or scalar to an alias. Once you have made these assignments, the aliases in the table will be recognized during the projection processing (see *Figure 2*).

Favorites is another useful feature of the variant editor. Through the use of Favorites, you can save and reuse selections for a variable in a selector table. For example, assume you are working with a premium mode variable that has a choice list of definitions of monthly, special monthly, quarterly, semiannual, annual and irregular. In your application, you only want to work with monthly and annual modes. A favorite may be set up to save your choice of monthly and annual modes.

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FIGURE 2



Aliases and Favorites can help you save time by creating reusable objects.

### Variant Table Aliases and Favorites


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When you define your choices for a selector, there is an option to Add To Favorites. This prompts you to assign a favorite name, which then adds the favorite name to the list of available selectors. If you create another

table, you can choose a favorite as the selector, which limits the choice list items to only those saved with the favorite (see *Figure 3*).

You can maintain favorites using Tools/Maintain Favorites on the menu bar in the variant editor. Aliases and Favorites can help you save time by creating reusable objects. ■

**FIGURE 3**



Name	Type	Source	Choice List
prem_mode	character	Favorite	Monthly,Annual
prem_mode	character	Data	Monthly,Special Monthly,Quar

## RECENT USER Q&amp;As

**Q)** The precision of things written using `log_strm` is less than the real value or the value written to the dbf file. How can I change the precision?

**A)** A `setprecision` and a `setw` command can be added to the `log_strm` statement to allow for more precision and more decimal places. Here is an example:

```
log_strm<<setprecision(10)<<setw(12)
<<column(t)<<endl;
```

These two commands will give a precision of 10 with 12 decimal places. These commands will apply to all columns in your `log_strm` statement.

**Q)** I have just installed a new version of MoSes in a different directory to my current version. How do I copy all the MoSes user login profiles from my old version to my new version of MoSes?

**A)** In your Vismoses directory, you will find an application called `usrdbf32x.exe`. When you open this application, specify the directory of your old version of MoSes in the Source directories area. Also, specify the directory of your new version of MoSes in the Target directories area. Then click Continue.

Your MoSes user login profiles have now been copied to your new MoSes directory. You can now log into your new version of MoSes with your old login details.

**Q)** How do I copy a task from one User Group to another while retaining datasources and variable values?

**A)** The process for copying Tasks between User Groups is slightly different from copying tasks within the same User Group. This is because datasources are set at the User Group level. The instructions are detailed below.

For simplicity, let us assume you are trying to copy a projection Task *Old Projection Task* from a User Group *Old User Group* into a newly created *New User Group*. The process is as follows:

Step 1: Copying the Task

- In the tree panel of the Task View, right-click and select **Add User Group**. Give it an ID and a description, e.g., *New User Group*.

- Right-click on the *Old Projection Task* and select **Copy Task**. In the dialog that appears, select the *New User Group*, *New Task Set* and give the projection task a description, e.g., *New Projection Task*.

You will notice that the projection task has been copied over (with the same Product Feature Set and Assumption Set, say these are *my\_product feature set* and *my\_assumption set*). However, the datasources have not copied over and are all set to default.

Step 2: Copying the Datasources

- Select the *Old Projection Task* in the *Old User Group*.

- Go to the Analysis View.

- Select the Assumption Set tab.

- Right-click and select **Copy Datasource**. (You may need to select a cell first before the right-click options appear.)

- The Copy Datasource and Assumption Sets dialog box appears. You will now need to set up the Destination properties. For example, set the Destination Product Feature set to *my\_product feature set* and Destination User Group to *New User Group*.

- Click **OK**.

- Return to the Task view and select the *New Projection Task* in the *New User Group*. You will now see that the datasources have been updated.

Step 3: Copying the Assumption Values

- Select the Product Feature and Assumption Set Organizer from the tool bar.

- Copy the assumption set from the *Old User Group* (in our case, *my\_assumption set*) into the *New User Group* and give it a description of your choice, such as *new\_assumption set*.

- Finally, select the *New Projection Task* and update the Assumption Set property in the property panel to *new\_assumption set*.

You have now copied the *Old Projection Task* from the *Old User Group* into the newly created *New User Group*. ■



## Windows NT Support

Effective January 1, 2007, we will no longer support the use of the Windows NT operating system with MoSes software. This means that we will no longer issue releases or updates developed and tested with Windows NT in mind. Clients who wish to take new releases or updates will need to upgrade to a supported operating system.

Microsoft has discontinued support for Windows NT as well, and we believe that most companies have moved on to supported operating systems. ■

## Training Schedule

Here is a list of training classes scheduled in our Atlanta offices during the next few months. To register or request further information, please contact Client Services at [support\\_us@towersperrin.com](mailto:support_us@towersperrin.com). After you register, we will send you logistics and travel details.

Dates	Description
Jan 22-24, 2007	TAS-MoSes Training
Feb 5-6, 2007	MoSes Basic Training
Feb 7-8, 2007	MoSes Developer Training
Mar 5-6, 2007	TAS-MoSes Training

## ABOUT TOWERS PERRIN

Towers Perrin is a global professional services firm that helps organizations around the world optimize performance through effective people, risk and financial management. The firm provides innovative solutions to client issues in the areas of human resource strategy, design and management; actuarial and management consulting to the financial services industry; and reinsurance intermediary services.

Our businesses include HR Services, Reinsurance and Tillinghast.

The Tillinghast business of Towers Perrin provides consulting and software solutions to insurance and financial services companies and advises other organizations on risk financing and self-insurance. We help our clients improve business performance in areas related to their financial, risk, product, distribution and capital issues. More information about Tillinghast is available at [www.towersperrin.com/tillinghast](http://www.towersperrin.com/tillinghast).

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