



TAS M – Considerations in applying the Standard

This document has been produced by the ACA TAS Implementation Working Group for the general information of ACA members. The document has been supplied to the Board for Actuarial Standards for its information but has not been approved by it. The document does not constitute formal advice.

Many of the principles contained in TAS M can be recognised as encapsulating existing good practice. However, there are certain aspects of the standard which will give actuaries pause for thought in its application, and this document is intended as a helpful discussion of some of these. It reflects the discussions of the ACA TAS Implementation Working Group on these aspects – it is not meant as a rigorous or complete explanation of the whole standard. All paragraph references are references to numbered paragraphs in TAS M, unless otherwise stated.

1. What is a model?

The definition of a model in TAS M may not be immediately in accord with what each actuary might intuitively assume.

The TAS M definition is:

“A representation of some aspect of the world which is based on simplifying assumptions.

*A model is defined by a **specification** that describes the matters that should be represented and the inputs and the relationships between them, **implemented** through a set of mathematical formulae and algorithms, and **realised** by using an implementation to produce a set of outputs from inputs in the form of data and parameters.”*

Our comments on this are as follows:

- Judgement will sometimes be required as to whether or not a calculation involves any “simplifying assumptions” and therefore whether it constitutes a model
- A model may be internally or externally developed. In the latter case it may not be immediately apparent what simplifying assumptions have been made in its specification
- A model is not restricted to a computer program or spreadsheet – a model can also be manual calculations
- It may be helpful to think of a model as a process to arrive at outputs, rather than just each single program which contributes to the process
- Any manual calculation, spreadsheet, or piece of software **used in preparing actuarial information** is likely to be (or to form part of) a model (C.2.1).

2. Non-actuarial systems

A non-actuarial system which merely uses actuarial factors (e.g. a pensions administration system) is not a model in scope of TAS M, because it is not used for actuarial work. Even if actuarial staff use

such a system, e.g. standing in for non-actuarial administration staff, we would not consider that to be actuarial work.

However, a program which produces actuarial factors such as early retirement factors is a relevant model. A program which produces both early retirement factors and calculates early retirement pensions using these factors is therefore also a relevant model, in its construction and its use.

3. Parsimony v. complexity

Principle C.3.14 states that a model shall be no more complex than can be justified. However, paragraph C.3.15 goes on to allow for “availability” as a justification for using a model that is more complex than necessary but which is nevertheless fit for purpose. We believe that in practice this means there should not be any problem with, for example, using (part of) an existing complex valuation system for relatively simple tasks where it is the most convenient tool to hand, provided that the extra complexity does not result in any adverse effect on ‘material information’ (including such information becoming obscured by immaterial information – see C.6.6 of TAS R).

4. Documentation and testing of existing models

We repeat the definition in TAS M of documentation, so as to differentiate between documentation (which will often be internal to the actuary’s work) and reporting to clients:

“Records of facts, opinions, explanations of judgements and other matters. Documentation may be paper or electronic based. It is not necessarily provided to users. Documentation is material if it concerns a material matter.”

Principle C.3.5 states that a set of checks shall be constructed and performed to determine the fitness for purpose of the model as a whole and of its specification, implementation and realisations. Principle C.3.6 requires that these checks be documented. Checks on the realisations from any models are clearly the responsibility of those producing the actuarial information.

For centrally produced models used across a range of clients or repeatedly for one client, the checks on these models’ specifications and implementations might more commonly be called ‘testing’. Many firms will have models which have been in use for a number of years, which are widely accepted as fit for purpose, and for which the procedures for checking realisations and for regression testing any model updates are well established. Is it necessary to re-test and further document these models if any original testing was not documented, or such documentation is no longer available?

This is not always necessary, accepting that a model that has been used many times over a long period is likely to require less checking than one that has not been used before. Further, TAS M only requires those checks that are performed in compliance with TAS M to be documented. An analysis which shows that regular past use of the model has shown it to be fit for purpose, that checks on realisations are carried out, and that any updates to the model have been tested is an example of a ‘reasoned and justifiable’ judgement that re-testing (or further documentation of past testing) is not needed for compliance with TAS M.

However, if the lack of testing or absence of documentation of past testing is judged to be a significant limitation of the model, or results in more uncertainty in its outputs, this should be explained to users (C.5.8). Given this, if a ‘reasoned and justifiable’ judgement concludes that the lack of historic testing or documentation does constitute a significant limitation of the model, it may be appropriate to carry out the appropriate level of testing and documentation before proceeding further.

5. Interrelationship with TAS R

We wish to draw to everyone's attention that TAS M includes some reporting requirements – in principles C.5.4 and C.5.8 and also in C.4.13 c) – which are additional to the reporting requirements of TAS R. Most of the other requirements of TAS M relate to documentation, rather than client reporting.

6. Interrelationship with TAS D (or, are we using a model or data?)

Exactly what does and does not constitute use of a model may not be immediately clear in every circumstance. For example, we would not consider the use of spot yields from a published yield curve (or e.g. the Bank of England website) to be using a model subject to TAS M. Rather, we would consider that such yields should be considered as data inputs to any actuarial model which uses them. In contrast, a client-specific exercise to calculate term-dependent yields from raw market data as part of an actuarial valuation would constitute modelling work in scope of the standard. Similarly, taking such published yields and extrapolating them to longer terms would constitute modelling work. The use of mortality rates from a published mortality table would constitute data inputs, as would the use of previous reports or reports produced by another actuary.

A potentially tricky question is to determine when the production of a set of model outputs is sufficiently separate from the piece of work that is delivered to a user (and in scope of the TASs) for it to be reasonable to take the view that data rather than a model is being used. Do the model outputs need to have been produced completely externally to the actuary's firm, or externally to the actuarial teams in a multi-disciplinary firm, or just externally to the actuary's immediate team? We can only suggest that judgement will often need to be applied, taking into account who is operating the models (e.g. the actuary's immediate team, or a separate non-actuarial function), their use, and the data they produce.

Where it is decided that data (rather than a model) are being used, the data used is of course subject to TAS D, both in terms of the actuary's opinion on the provenance and suitability of the data, and in terms of its documentation as data.

Further, an actuary's reports should be made in accordance with TAS R with respect to such data, giving its description, its source, and a description of any uncertainty over its accuracy along with an explanation of any approach taken to such uncertainty in the calculations or results.

7. Use of Externally Developed Models

As set out in paragraph C.2.2, the extent and nature of the required documentation and checks on externally developed models which are used in actuarial work will be a matter of judgement. Actuaries may well take into account the provenance of externally developed models in making these judgements. As an example of one source of required documentation, the initial purchase or licensing of an external model may well have involved technical due diligence which will have been documented.

One way to consider what may be required when using an external model is the actuary's involvement with the specification of, implementation of, and realisations from a model. This might involve a judgement (similar to that discussed in relation to model or data (see 6. above)) as to the extent to which the model is "externally developed".

For an external model, or a standard internal model, the specification and implementation will normally already be in place when an actuary comes to use it. The actuary will be concerned that they (the specification and implementation) have been adequately documented and tested. However, use of the model to obtain the relevant realisations will be the responsibility of the actuary (and team).

A bespoke model will, however, require the actuary to consider fully its specification and implementation, as well as the realisations.

This document is available on the ACA's website at www.aca.org.uk.

The ACA does not intend to keep this document under review.

Version 1.0 – March 2011