



January 21, 2015

Dr. Lorilee Medders, Chair
Florida Commission on Hurricane Loss Projection Methodology
c/o Donna Simons
Florida State Board of Administration
1801 Hermitage Boulevard, Suite 100
Tallahassee, Florida 32308

Re: AIR Atlantic Tropical Cyclone Model V14.0.1 as Implemented in Touchstone® V1.5.3

Dear Dr. Medders:

AIR would like to notify the FCHLPM (Commission) that we have discovered an issue in Touchstone Version 1.5.3 in which the AIR Atlantic Tropical Cyclone Model Version 14.0.1 was implemented. On April 14, 2014, this model/software was found equivalent to our model/software submitted and found acceptable under the 2011 Report of Activities (i.e. AIR Atlantic Tropical Cyclone Model Version 14.0.1 as Implemented in CLASIC/2 Version 14.1.0). For your convenience we are enclosing as Attachments A and B both the letter requesting functional equivalence of the model/software in question, and the letter granting it.

In compliance with the procedures in the 2011 Report of Activities, Section VI.E., this letter of notification details

- The nature of the issue;
- Why the issue has occurred;
- What is needed or has been done to correct the problem;
- The time frame needed for making the correction; and
- Any other relevant documentation necessary to describe both the issue and the correction.

Nature of the Issue

The issue affects the part of the software that applies the financial policy conditions to ground up losses to yield gross losses and only impacts two specific residential deductible types, described below. The issue is caused by an incorrect step in a decision tree whereby the software takes one path to produce gross losses when it should have taken another.

Generally two policy conditions are applied when calculating gross losses from ground up losses: deductibles and limits. Additionally, a policy can have one of many different deductible types. For this issue, only two residential deductible types are affected, specifically deductibles which treat Coverage D separately from the other coverages:

- 1) Combined Including Time Element Separately – this deductible is computed by combining the deductible amounts for Coverage A (building), B (other structures) and C (contents) and applying the total deductible

amount across loss from all three coverages. The deductible for Coverage D (Time Element) is applied separately to the time element loss. For residential policies Coverage D is for loss of use of the structure, or the additional living expenses experienced when the home is uninhabitable and being repaired. In AIR's nomenclature, these are **D Type deductibles**.

- 2) Combined Excluding Time – this deductible is computed the same as Combined Including Time Element, except that no deductible is applied to time element loss. In AIR's nomenclature, these are the **B Type deductibles**.

These particular deductibles are most commonly used for residential policy types. In Florida the annual aggregate (a.k.a. hurricane) deductible is mandated for residential policies starting in 2005, however our clients may use the two impacted deductible types in some cases. Note that the annual aggregate deductible type is not affected by the issue described here.

Please refer to Attachment C for a visualization of the software workflows impacting this issue. The flowchart on the left in Attachment C shows a simplified workflow for Touchstone 1.5.2, and on the right is shown the modified workflow in Touchstone 1.5.3. The primary difference in workflows is that Touchstone 1.5.3 assumes there is a layer term on the policy. This assumption is made for commercial and for residential (e.g. B and D) deductible types.

When there is a layer term, the financial engine utilizes the means and standard deviations of the distributions instead of carrying the full distributions through the calculation. Hereafter these two methods are referred to as **Sum of Means** and **Convolution**, respectively. They represent equivalent calculations but use slightly different computational methods. It is a statistical principle that if you know the form of a distribution as well as its mean and standard deviation, you can generate the entire distribution. For certain paths in the financial engine, we utilize this principle and the Sum of Means method, and for other paths we retain the full distribution throughout. Because of computer limitations, the distributions retained in the financial model are not truly continuous (requiring an infinite number of values) but discrete to some extent. Therefore, the two methods – using the means and standard deviations vs retaining the distributions throughout– produce very similar but not identical losses.

The issue impacting these two deductible types causes very small differences in loss costs in Florida compared with Touchstone 1.5.2. For example, for a well-diversified Florida residential portfolio, the average annual loss shows an impact of less than 0.01%.

Why the Issue Has Occurred

In Touchstone 1.5.3 we introduced improved functionality to handle a specific use-case where a policy has more complex coverage terms. This enhancement was described in the third bullet point in our March 28, 2014 letter:

- The software was enhanced to allow analysis of multiple perils concurrently (e.g. earthquake and severe thunderstorm) for a specific exposure structure configuration, where a policy has both sublimits and multiple peril specific location terms (e.g. deductibles). For example, a policy with a \$500 earthquake

deductible and a \$250 severe thunderstorm deductible for the same location, as well as a \$10,000 sublimit on California earthquake losses, can now be analyzed for both perils concurrently. For easy reference we can call this the **multi-peril enhancement**.

This particular enhancement also unintentionally impacted the above mentioned deductible types because the workflow was not limited to commercial policies with complex policy terms. As can be seen in Attachment C, the code for the multi-peril enhancement did not contain a key decision question: "does this policy have a layer". Absent this decision point, the B and D deductible type policies flow down the path using the Sum of Means method instead of the path using the Convolution method as they did previously. This workflow change for the B and D deductible types also caused a slowdown in calculation times for residential policies, which was an important factor in the discovery of the issue.

Discovery of the Issue

We became aware of this issue with the potential to impact Florida loss costs while completing a project for one of our clients at the beginning of January, 2015. One deliverable of the project was a sensitivity test comparing event losses for the same book, changing only the deductible type from annual aggregate to combined excluding time element (i.e. B type). One of the verifications done in previous years of this project is to make sure the losses for the first event are equal. For our January 2015 analysis using Touchstone 1.5.3 this was not true; we saw very small differences in the first event losses on the same order as the Florida portfolio mentioned in the *Nature of the Issue* section of this letter. This started an investigation into the cause of the loss differences.

We first determined that the issue was confined to Touchstone 1.5.3. Our investigation also revealed that earlier in 2014 through QA testing we became aware of a slow-down in computation time for some residential portfolios with simple policy terms. During this time period in the spring of 2014 AIR was preparing for its next annual software release to clients, Touchstone 2.0. Touchstone 2.0 was not submitted to the Commission due to timing between the publication of the November 1, 2013 ROA and AIR's own model/software development cycle. In the process of addressing the slower runtime issue, the issue discussed in this letter was also fixed in Touchstone 2.0. As mentioned above, we were not aware that this issue had the potential to impact loss costs and PMLs in Florida.

Touchstone 2.1 which we submitted to the Commission in November 2014 is also free of the issue described in this letter since it is essentially branched from Touchstone 2.0. The issue is therefore isolated to Touchstone 1.5.3.

The issue was not identified during the normal QA for the Touchstone 1.5.3 software release. The focus of the testing for the implementation of the multi-peril enhancement was on the commercial policy use-case because residential policies do not see exposure structure configurations contemplated by the enhancement. As such, we did not include residential deductible types in the test cases, which would have shown a difference in losses from the prior version of Touchstone.

Lastly, it should be noted that, when submitting Touchstone 1.5.3 to the Commission, the issue did not show itself in the normal regression tests required by the ROA under section VI.G. (i.e. reproducing Forms A-4, A-8 and S-5) since the annual aggregate deductible type is used for the submission.

What Is Needed to Correct the Issue

The issue will not present itself in Florida rate filing situations unless the insurer has used one of the two deductible types in question rather than the annual aggregate deductible type. Two potential courses of action can be taken:

1. AIR can notify clients so they more fully understand the nature of the issue and determine whether their rate filing work is impacted;
2. AIR can issue a new version of the software that corrects the workflow for the two residential deductible types.

Time Frame Needed to Correct

If the second course of action is needed, AIR anticipates being ready to issue this patch to clients by the third week of February, 2015.

We look forward to discussing this with the Commission and addressing all questions and next steps.

Best regards,



Brandie J Andrews, CCM
Assistant Vice President

Attachments



February 9, 2015

Dr. Lorilee Medders, Chair
Florida Commission on Hurricane Loss Projection Methodology
c/o Donna Sirmons
Florida State Board of Administration
1801 Hermitage Boulevard, Suite 100
Tallahassee, Florida 32308

Re: AIR Atlantic Tropical Cyclone Model V14.0.1 as Implemented in Touchstone® V1.5.3

Dear Dr. Medders:

AIR would like to thank the Commission for the feedback received today regarding our letter of January 21, 2015. Specifically,

“The notification to Dr. Medders follows the procedures in the 2011 Report of Activities. After discussing with Dr. Medders, the notification should follow the procedures in the 2013 Report of Activities. Since the model was found acceptable under the 2011 Standards, the continued acceptability of version 14.0.1 will always be reviewed under the 2011 Standards. The acceptability of a model remains with the set of standards the model was found acceptable under; however, the correct procedure is to follow the current process which is the Acceptability Process in the 2013 Report of Activities. Please refer to Section VI.F. of the Acceptability Process.”

In compliance with the 2013 Report of Activities, Section VI.F., AIR submits Forms A-1, A-4, A-8 and S-5. The differences between the model as found acceptable by the Commission fall into the **Type 1** category, if measured with the hlp2007com.txt data that is used to prepare the forms in the submission. There are no differences in loss costs for any five digit ZIP Code area and there are no differences in probable maximum loss levels for any return period.

We look forward to discussing this with the Commission and addressing all questions and next steps.

Best regards,

A handwritten signature in black ink, appearing to read "Brandie J. Andrews", with a long horizontal flourish extending to the right.

Brandie J Andrews, CCM
Assistant Vice President

Attachments