PGI Dimension - AAU

Radius optimisation

Lucy Cooper, Applications Engineer

Introduction

When analysing a trace in the Aspherics Analysis Utility (AAU) there is an option to view the optimised radius. (Analysis using the optimised radius reveals the underlying form errors.) The original method used to find the optimised radius was the Root Mean Square (RMS) method.

The AAU user now has a choice to find the optimised radius using two methods.

- Method A: Minimum Pt value method
- Method B: Current RMS method

The user can choose the method depending on the requirement.

An option is also included to specify a radius tolerance band. The user can input an upper and lower radius limit to keep the radius within the specified tolerance. This technical note shows the procedure for both methods with example results.

Procedure

1 Open the analysed trace in the AAU and use the dropdown box to select **Best Fit Radius**. (See Figure 1).
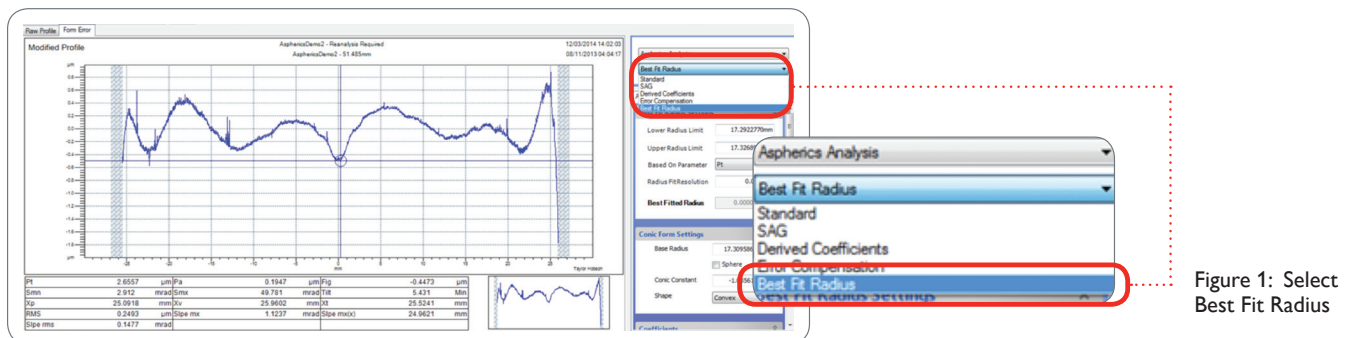

Figure 1: Select Best Fit Radius

2 In the **Best Fit Radius Settings** box choose an **Upper Radius Limit** and **Lower Radius Limit**, the **Radius Fit Resolution** and either **Pt** or **RMS** for the parameter used to determine the optimised radius.

Method A

The first example shows the results with the parameter **Pt** chosen. The base radius entered in this example was 17.30956 mm. The upper and lower tolerances were the base radius +/- 0.1 %. The chosen **Radius Fit Resolution** 0.0173 um. This is the initial radius increment used in the radius optimisation process.
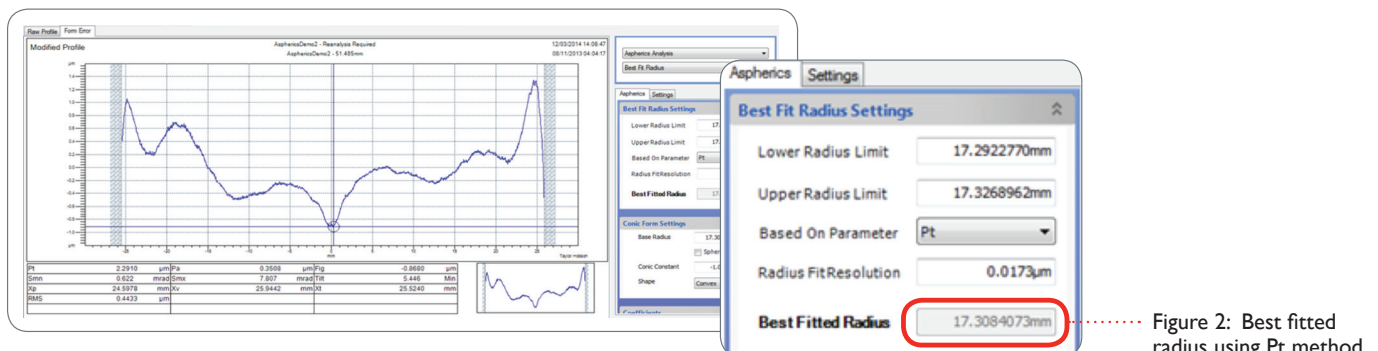

Figure 2: Best fitted radius using Pt method

Method B

This example shows the results with the **RMS** method chosen. The base radius, upper and lower tolerances, and radius best fit resolution remained the same.
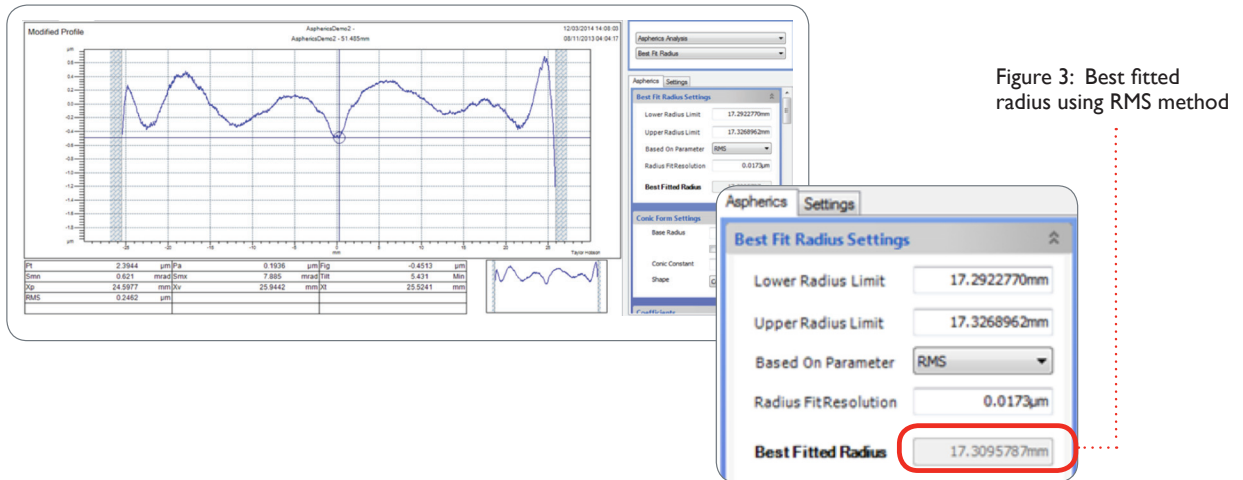

Figure 3: Best fitted radius using RMS method

Results

Using the parameter **Pt** the best fit radius was 17.3084073 mm and using the parameter **RMS** the best fit radius was 17.3095787 mm.

Choosing the tolerance level

Choose the largest radius tolerance available to help find the best fitted radius. Check that the best fitted radius value is between the upper and lower radius limit. If it is the same as either one of the limits, it may need changing.

Using the RMS example and tightening the radius tolerance gives the following results. In this example the lower radius limit changed from 17.2922770 mm to 17.32 mm. The best fitted radius is now 17.32 mm. The Pt is high and the shape not ideal so this would suggest the lower radius limit needs reviewing.
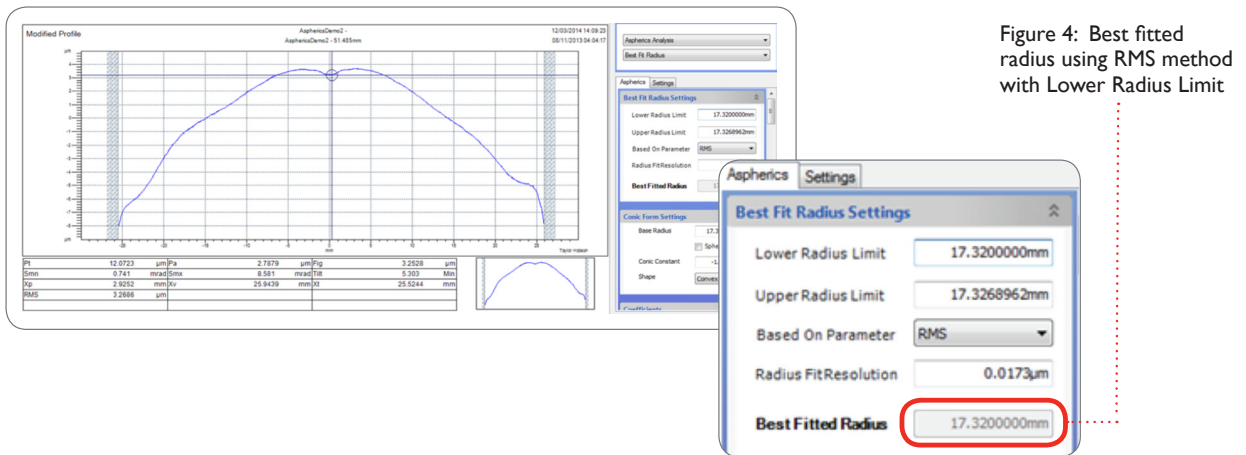

Figure 4: Best fitted radius using RMS method with Lower Radius Limit