

AFGROW Workshop 2011 - Layton, UT

Recent Developments in AFGROW COM and Plug-In Applications

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Goals Of Developing Plug-In Example

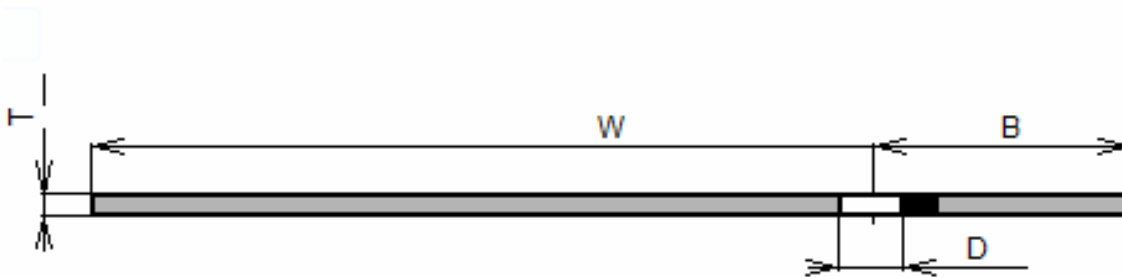
- Gain Experience by developing a working AFGROW/StressCheck Plug-In Model
- Test the current AFGROW Plug-In Interface and determine areas for improvement
- Improve our ability to provide support for Plug-In Models using StressCheck
- This experience was necessary for the creation of a step by step development manual

Plug-In Development Plan

- Choose a simple model that has a corresponding classic solution
- Do not get too complicated – use a 2D model
- Build parameterized StressCheck models:
Handmeshed and Automeshed
- Create Excel prototypes and test COM automation of StressCheck
- Use Windows 7 and Dev Studio 2008 to develop the Plug-In Model
- Evaluate the results

Model

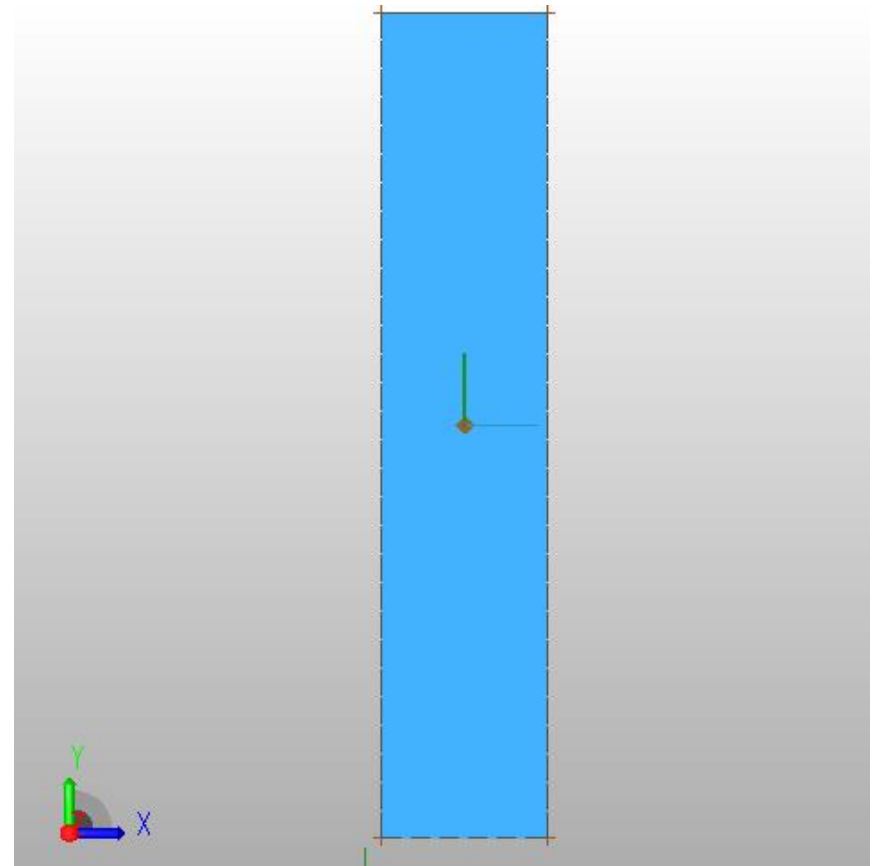
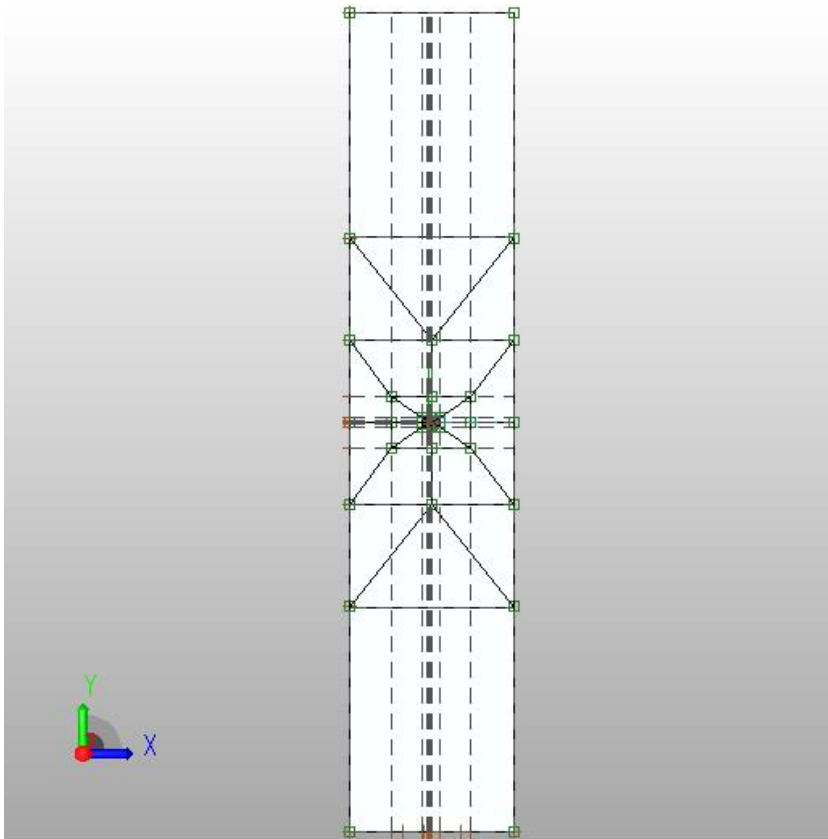
Through Crack at Hole under Tension,
~~Bending~~ and Bearing Loading



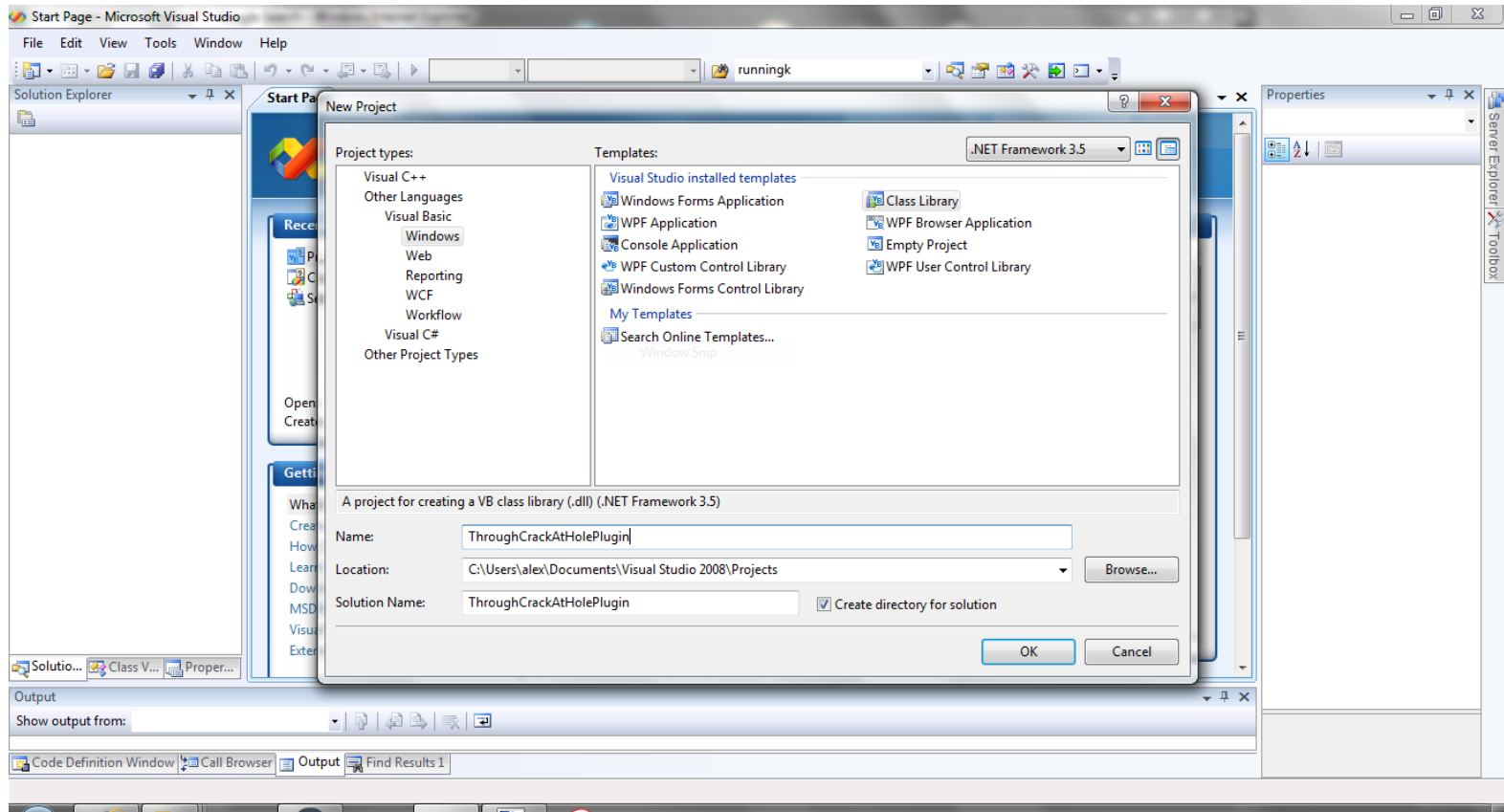
Parameters:

Width, Thickness, Hole Diameter, Hole Offset,
Crack Length

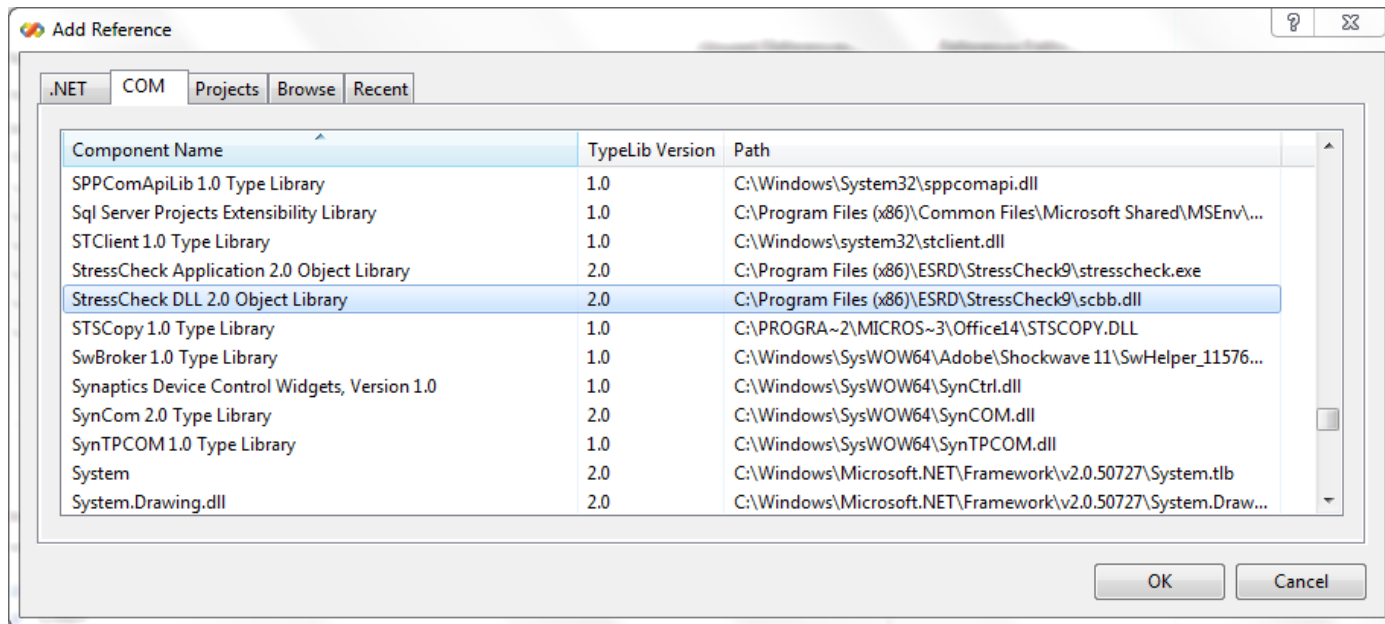
StressCheck Models



Plug-In Development: Create Project



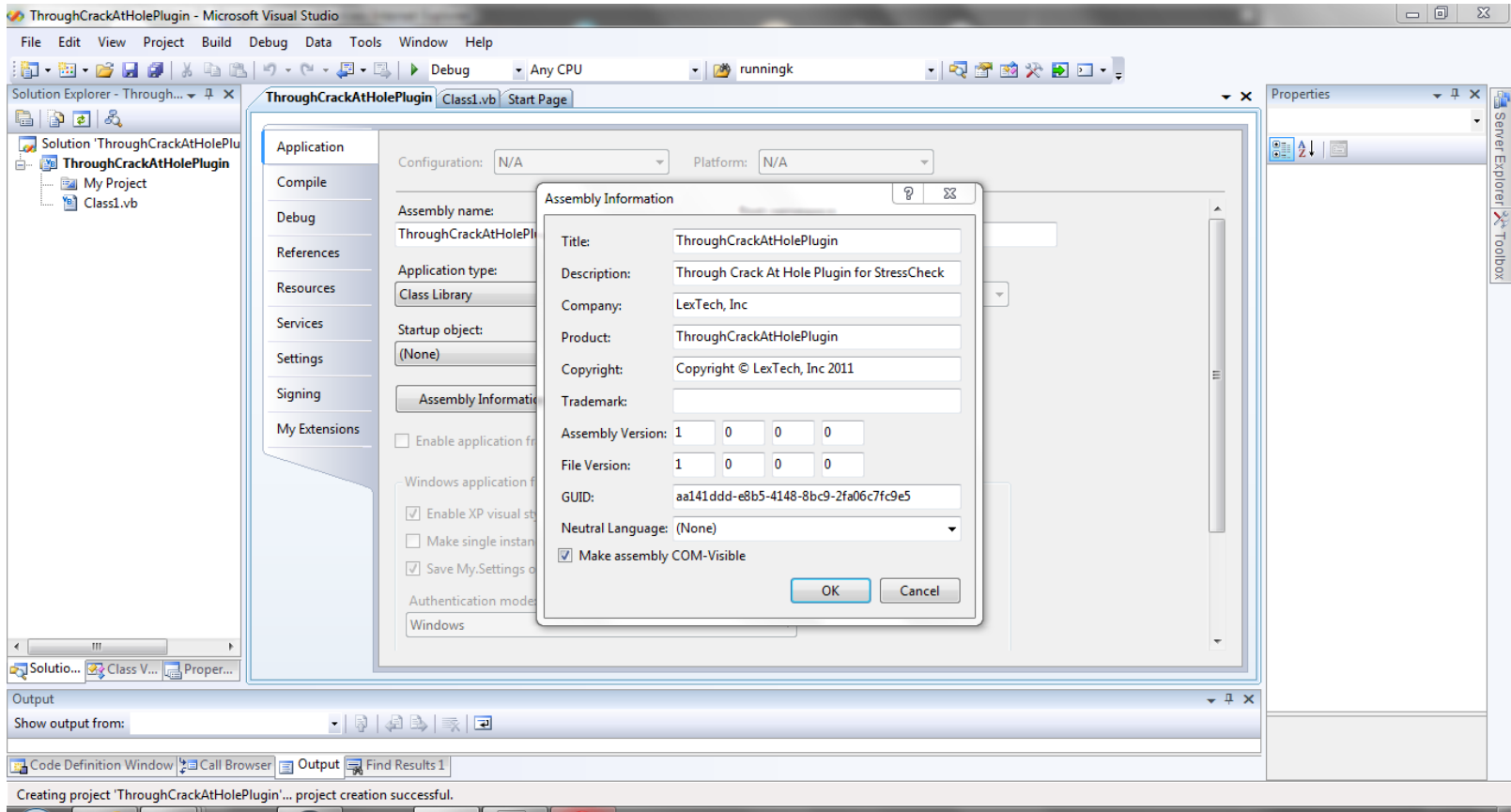
Project Setup - Reference



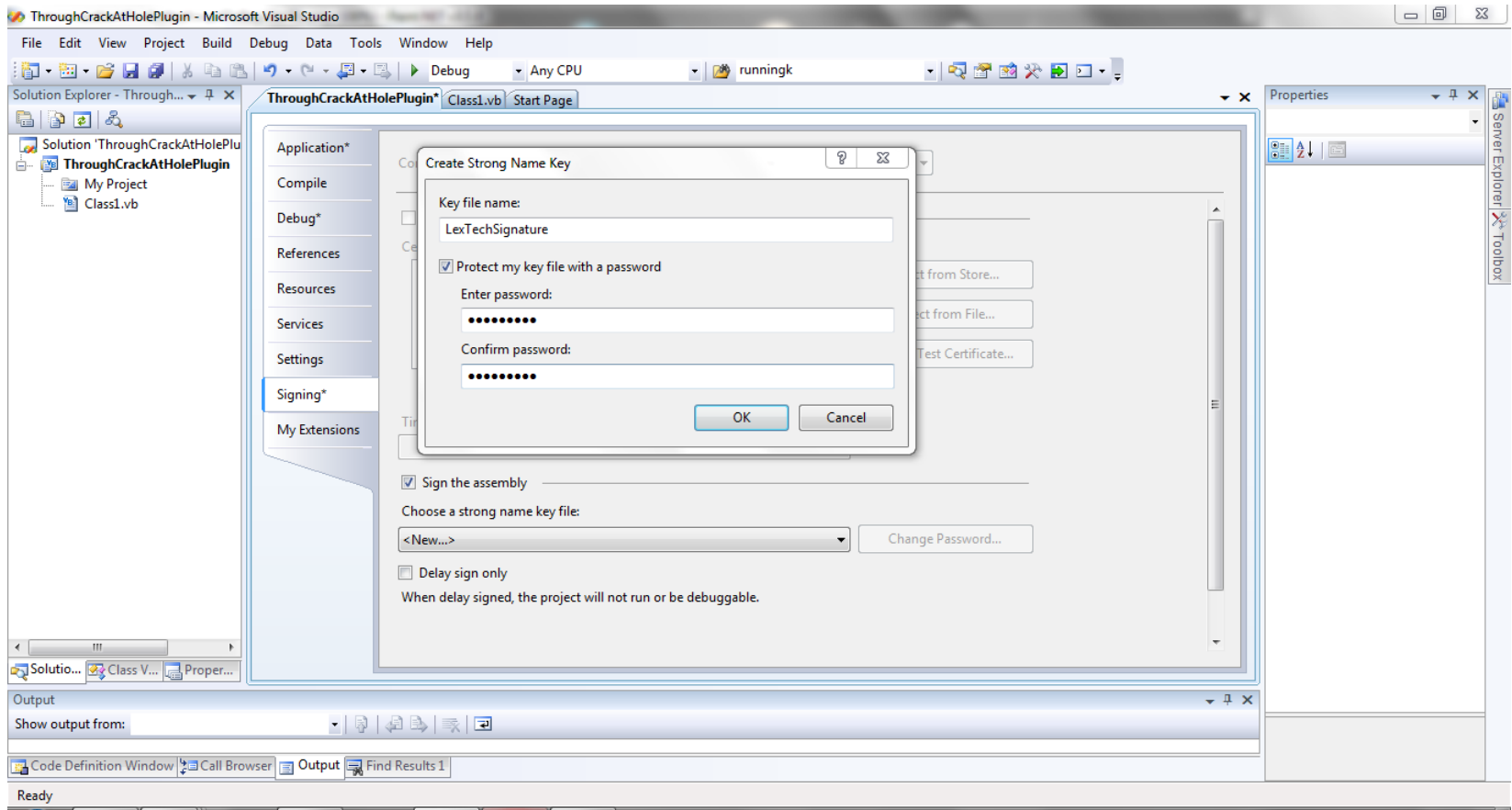
StressCheck Black Box dll needs to be registered:

Regsvr32.exe scbb.dll

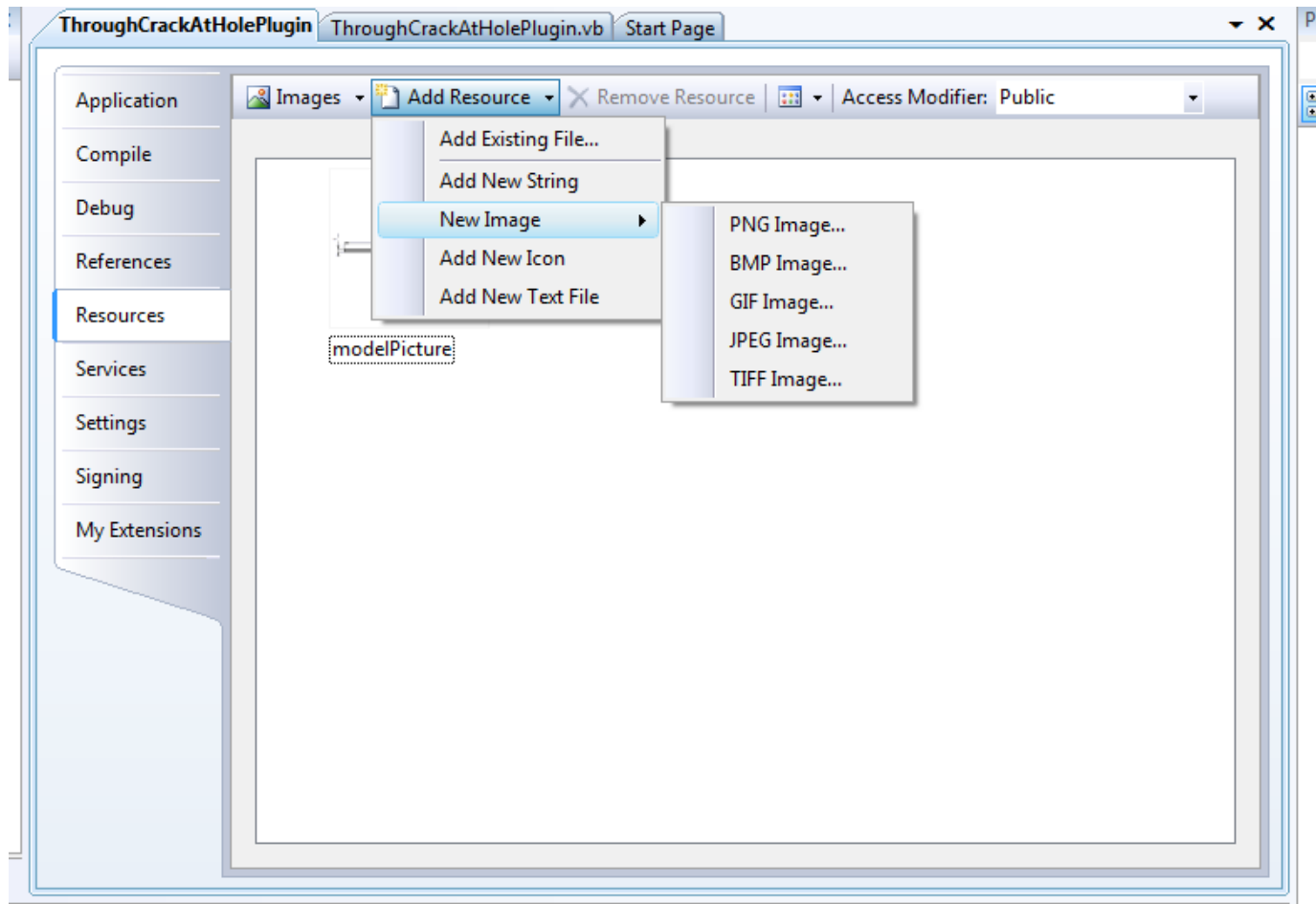
Project Setup – Make Assembly Visible Through COM



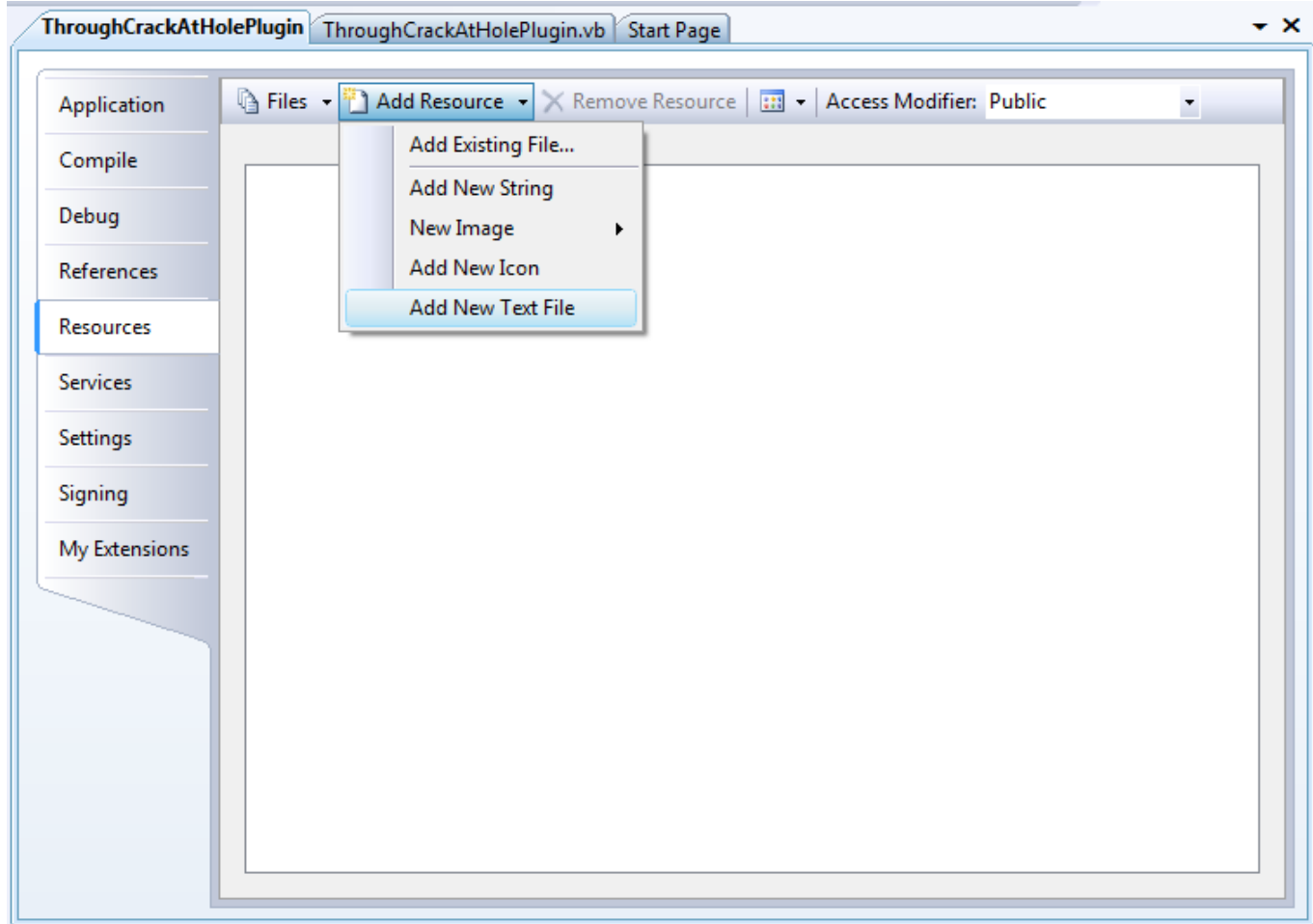
Project Setup – Sign Assembly



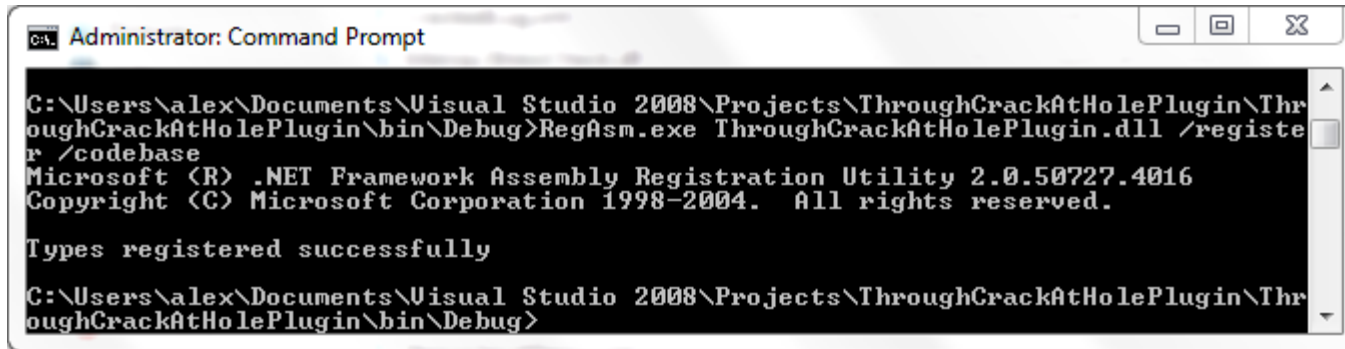
Project Setup – Add Model Definition Image to Resources



Project Setup – Add StressCheck files to Resources



Register .NET Dll



```
Administrator: Command Prompt
C:\Users\alex\Documents\Visual Studio 2008\Projects\ThroughCrackAtHolePlugin\Throug
oughCrackAtHolePlugin\bin\Debug>RegAsm.exe ThroughCrackAtHolePlugin.dll /registe
r /codebase
Microsoft (R) .NET Framework Assembly Registration Utility 2.0.50727.4016
Copyright (C) Microsoft Corporation 1998-2004. All rights reserved.

Types registered successfully

C:\Users\alex\Documents\Visual Studio 2008\Projects\ThroughCrackAtHolePlugin\Thr
oughCrackAtHolePlugin\bin\Debug>
```

- Start Dos Command Prompt As **Administrator**
- 2 switches: **register** and **codebase**

Findings

- Plug-In Interface is missing the ability to acquire properties available through the AFGROW Automation COM Interface
- Impossible to modify crack parameters during prediction
- Very limited GUI support of the Plug-In
- AFGOW freezes during StressCheck runs
- Impossible to calculate K critical
- No Plots

Future Modifications for the Plug-In Interface

- Add an event that will be executed immediately after calculation of the crack length increment (will give users the option to modify crack length)
- Give users access to the COM Application Interface
- Add the ability to place bitmaps on the drawing window via the Plug-In Drawing interface
- Investigate the possibility of adding different windows/views to the AFGROW frame using the Plug-In interface
- Add “thickness” to the Plug-In crack direction parameters list
- Add ability to extract material properties from all AFGROW material models

Summary

- A simple AFGROW/StressCheck Plug-In Model was developed in-house
- Several issues were discovered that have allowed us to improve the plug-in interface for use with StressCheck
- The interface improvements will be included in the next AFGROW release