



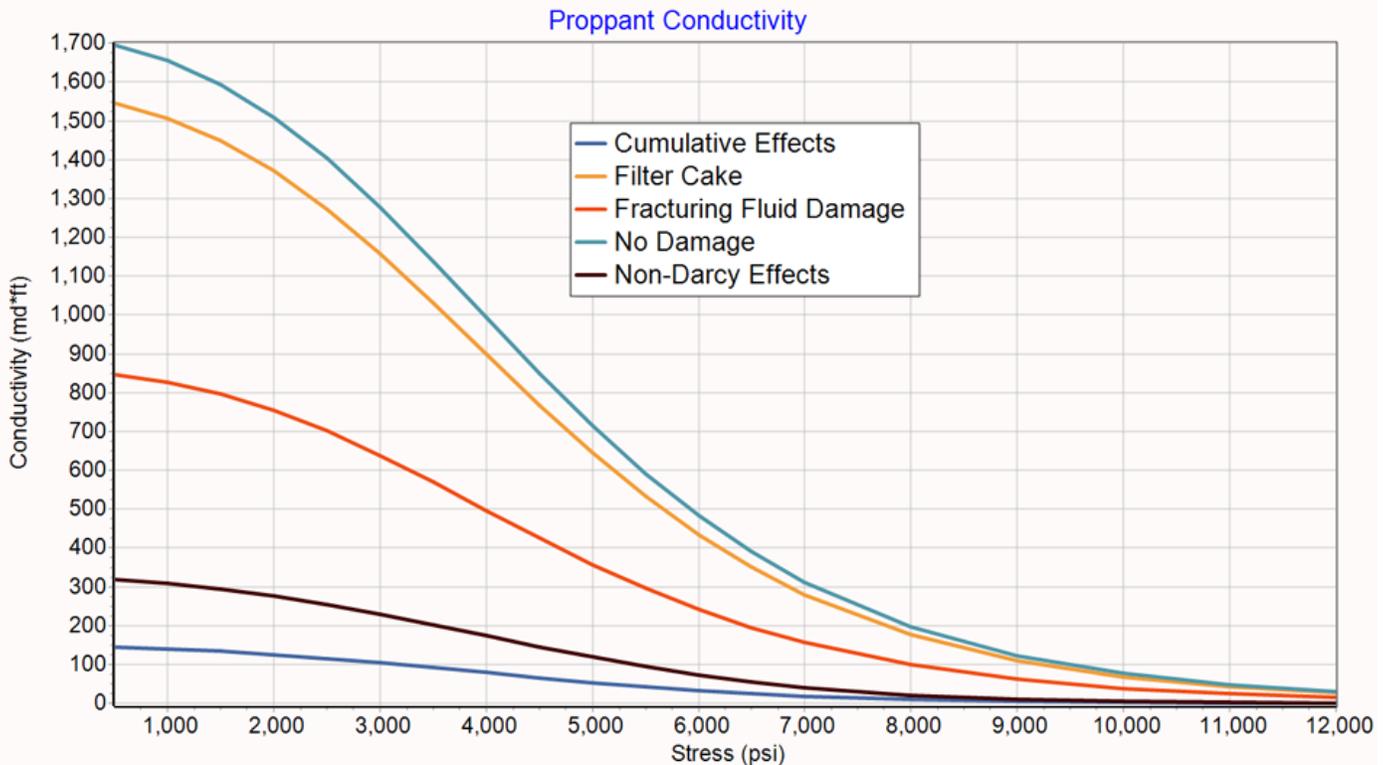
PREDICT-K “TIP OF THE MONTH”

Downhole Conductivity

After our most recent Consortium meeting, in an effort to gather more feedback from our Consortium members, we distributed a survey to each of the member companies. Some of the questions in the survey asked about improvement suggestions for Predict-K and areas where more research was needed. One of the responses was a general comment that Predict-K does not adequately provide or model downhole conductivity. However, Predict-K is built around calculating and utilizing proppant pack permeability at downhole conditions with multiple damage factors included.

The Baseline Conductivity mode focuses mostly on the effects of stress and temperature. The Dynamic Conductivity mode directly shows the effects of the various corrections from laboratory conditions to flowing well conditions. These corrections include multiphase flow, non-Darcy flow, fracturing fluids damage effects, and loss of flowing width due to residual fracturing fluid filter cake.

The graph below shows the corrections being applied to a 1 lb/ft² 30/50 sand pack. The top curve shows the conductivity with only stress and temperature corrections made. The next three curves show the effect of applying a single correction for either filter cake width, fracturing fluid damage, or non-Darcy flow. The bottom curve shows the conductivity with all of the corrections applied together. For the damaged cases, a filter cake width of 0.01 in was used (about 10% of the unstressed pack width), a 50% reduction of permeability was applied based on fracturing fluid effects, and a gas rate of 10 MMscf was used for non-Darcy effects. If a closure stress of 3,500 psi exists during production, the conductivity drops from 1138 md-ft with no damage to 91 md-ft with all of the above factors considered. The only remaining factor is the multiphase effects. With oil and water rates both set at 10 bbl/MMscf, conductivity drops to 20 md-ft. In total, the damage reduces the proppant pack conductivity by more than 98%.



These same corrections are applied automatically in the Production mode and adjusted based on the actual flowing conditions of the well. Filter cake width and cleanup are corrected based on the frac fluid stipulated and the correlations developed through extensive testing performed by the Consortium. Non-Darcy and multiphase flow are incorporated based on the actual flowing fractions and rates from the Predict-K simulation. The effective conductivities at these reservoir conditions thus determined are available in the Production mode as a function of time step by referring to the Report tab. This functionality was discussed in our tip from May, 2017.

These Predict-K tips are emailed so they can be easily forwarded to others that may not be on the email distribution list. We hope you enjoy these tips and find them useful, but if you would like to be removed from this list please click the Unsubscribe link below. A new email will be created using your default email client. If the link does not work for you simply reply to this email with 'Unsubscribe' in the subject line and you will be removed from the list. If this email was forwarded to you and you would like to be added to the distribution list, please forward this email to Stimlab.Contact@corelab.com with 'Subscribe' in the subject line.

[Unsubscribe from Predict-K Tip of the Month](#)

To view the Predict-K Tip of the Month archive please go to: <http://www.corelab.com/stimlab/predictk-tip-of-the-month>

To view our Predict-K training videos main page please go to: <http://www.corelab.com/stimlab/training-videos>

Predict-K Training Videos (opens in YouTube):

1. [How to obtain your license for Predict-K and Proppant Manager](#)
2. [Predict-K Main Screen](#)
3. [Quick Entry](#)

4. [Predict-K General Structure](#)
5. [Creating a New Proppant Manager Database](#)
6. [Running the Proppant Manager Correlations](#)
7. [Exporting Proppant Manager Results to Predict-K](#)
8. [Baseline Conductivity](#) [Demonstration Base Project for Videos 8 - 10](#)
9. [Dynamic Conductivity](#)
10. [Production Analysis Overview](#)
11. [Adding Production Data to Predict-K](#) [Demonstration Base Project for Video 11](#) [Simulated Production Data Excel File](#)
12. [Matching Production Data](#)
13. [Changing Default Units](#)
14. [Treatment Options](#)

Stim-Lab Inc. | www.stimlab.com | 7118 N Hwy 81 | Duncan, OK 73533 | 580-252-4309