

Rapid Type Well Profile (TWP) Tool



What Are Type Well Profiles?

Type Well Profiles (TWPs), also called “type curves”, are estimated production forecasts for potential future or recently drilled wells that are based on the actual historical production of analogous wells. They’re typically used where analytical reservoir engineering techniques are insufficient to make accurate production forecasts.



TWPs are often used to predict the future performance of hydraulically fractured horizontal wells in unconventional reservoirs. These wells have complex fracture geometry, encounter heterogeneous reservoir properties and may have complex fluid flow regimes that make analytical methods impossible to apply. We typically see significant, random variation in performance among unconventional wells, which suggests the appropriateness of a statistical approach.

The Problem

Simple TWPs are often created by merely averaging the historical normalized production data from a group of wells and curve-fitting the result to obtain the decline curve parameters. However, this approach has several problems, some of which include:

- **Survivor bias** - Since the number of wells in the sample decreases over time, the average becomes less reliable and tends to reflect older well performance
- **Lack of lateral length normalization** - Lateral length has a strong influence on well performance; many plays contain wells with a wide range of lateral lengths that need to be considered
- **Failure to consider the impact of well spacing** - Wells drilled on closer spacing may perform differently than widely spaced ones, and well spacing often changes over time
- **Inability to account for evolving technology** - Operators are constantly adjusting completion designs (i.e., proppant amounts, fluid volumes, cluster spacing, etc.) and these factors need to be considered in estimating future performance

A simple TWP analysis that doesn't account for these factors is likely to be misleading. A robust TWP analysis, however, requires a great deal more work and time to integrate data from multiple sources, prepare individual production forecasts, normalize the production data, identify bins to aggregate analogous wells, examine the impact of numerous independent variables, aggregate the normalized data, generate average production curves and curve-fit the averages to derive the decline curve parameters of the TWP.

Historically, this has required engineers to move data between multiple software programs such as databases, spreadsheets, petroleum economics, GIS and data visualization software. The process is time-consuming, requires skill in multiple software packages and access to subscription-only data sources.

It can take several days for an engineer to develop a robust TWP analysis; often, engineers lack the time to conduct the detailed analysis needed to get a more reliable answer. Instead, they take a simple approach and hope for the best. Also, many investors, lenders and others with an important interest in predicting well performance lack the tools, data and skills needed to conduct a robust TWP analysis on their own.

Our Solution

Ralph E. Davis Associates LLC (RED) has developed an in-house software solution and workflow that greatly reduces the time required to conduct a rigorous TWP analysis. Using Spotfire as its centerpiece, we're able to create individual production forecasts, normalize them for time and length, bin them by any variable, aggregate and curve-fit them to obtain TWPs with their decline curve parameters in a single pass. Also, because we generate an estimated ultimate recovery (EUR) value for every well in our sample set, we're able to examine the impact of multiple variables on well performance.

RED's solution is not a "black box" with expensive licensing fees that you hope you can fit to your situation. Rather, it's a fully customizable, transparent process that RED's engineers use to deliver high-quality TWP analyses for its customers at a fraction of the cost that others can. There's no need to purchase any software or data, and there's no additional cost when the tool is used on your project.



Benefits of Red's TWP Tool

- **Uses future projections and historical production** - Future production is quickly estimated using high-quality curve-fitting algorithms. Individual forecasts can be examined and adjusted manually. An EUR estimate is made for each well.
- **Incorporates transient well spacing** - Using RED's proprietary GIS modeling, we estimate a pseudo-drainage area for each well for each year of its historical production. This data is converted into a nominal well density parameter that changes over time, reflecting the offsetting wells that are present now and each year in the past.
- **Multi-variate analysis** - By quickly generating an EUR for every well, we can examine the dependency of well performance on any variable to determine which key factors drive performance and to what degree.
- **Easy integration of proprietary data** - Our system is constructed to make it easy to add proprietary data, such as petrophysical, geologic, reservoir, completion or production data.
- **Unlimited visualization possibilities** - Spotfire's unmatched visualization capabilities make it possible to examine the data in an unlimited number of ways and share the results with others so it's easy to understand.
- **Experienced engineering advice and affordability** - RED's experienced engineers bring to bear their knowledge and judgement to each analysis; you get more than just data analytics. Additionally, RED deploys its TWP tool on its client's projects at no extra cost. You save money by getting a faster and more thorough analysis.

To learn more about our rapid TWP solution, contact our professionals below and we will initiate the introduction to our team to assess your requirements.

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