

HiWAY

Flow-channel hydraulic fracturing workflow for shale formations

APPLICATIONS

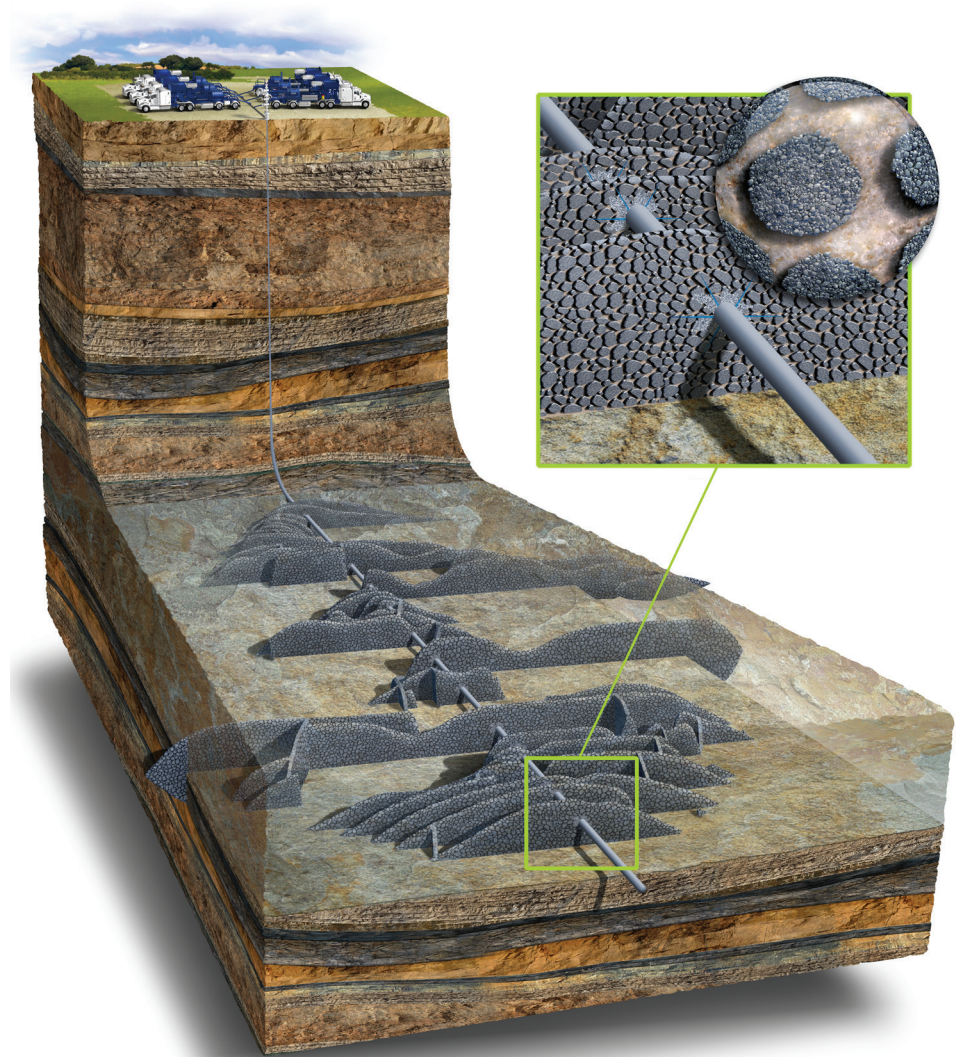
- Shale formations with complex, naturally fractured networks
- Single- and multistage, vertical and horizontal oil and gas wells
- Formation temperatures from 100 to 300 degF

BENEFITS

- Reduces environmental footprint using less fluid and proppant
- Increases fracture conductivity and effective contact area with lower horsepower requirements
- Minimizes risk of screenout

FEATURES

- Integrated workflow for complex fracture modeling
- Customizable fiber solutions based on well characteristics
- High pump rates—up to 100 bbl/min with specialized blenders—to meet virtually any completion strategy



Optimize production, minimize footprint

In shales, achieving effective stimulation of the target formation with slickwater, linear gels, or hybrid fluid requires huge amounts of water and proppant. Transportation of materials and equipment to job sites involves complex logistics, which can lead to nonproductive time and higher costs.

The main strategy behind these treatments was to treat as much surface area as possible in the complex fracture network. However, large treatments do not always induce secondary and tertiary fractures.

HiWAY* flow channel fracturing technique for shales incorporates a workflow process that maximizes production in tight shales while reducing the fracturing footprint on location.

Achieve infinite fracture conductivity

The HiWAY technique fundamentally changes the way proppant fractures generate conductivity. It decouples fracture productivity from proppant permeability and creates stable flow channels. Instead of flowing through the proppant in the pack, hydrocarbons flow through channels, increasing conductivity by orders of magnitude.

Conductivity extends all the way to the tip of the fracture, allowing for longer effective fracture half-length, higher effective contact area, better fluid and polymer recovery, and less fracture face damage. These effects mean optimized production and superior hydrocarbon recovery.

Customize completion designs

HiWAY flow-channel fracturing technique for shales features an integrated workflow to help maximize production from planning to production.

First, Mangrove* reservoir-centric stimulation design software uses all available reservoir data to model HiWAY jobs within the formation's natural, complex fracture networks. The predictions can then be used to optimize fracture designs, increasing stimulated reservoir volume.

A pump advisor monitors the job as it is performed, ensuring proper placement. Customized fibers improve flowback and well cleanout in a wide range of bottomhole static temperatures.

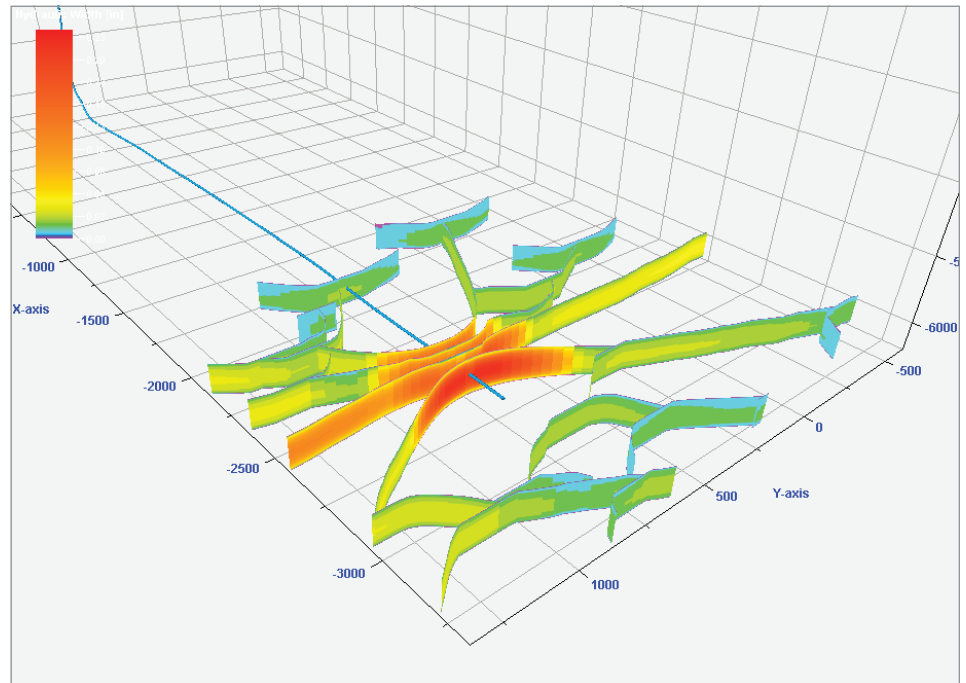
Finally, through pressure matching, micro-seismic, or other acquired data, fractures can be calibrated back in Mangrove software to improve the design for the next well—closing the design-execute-evaluate cycle.

Use less water and proppant

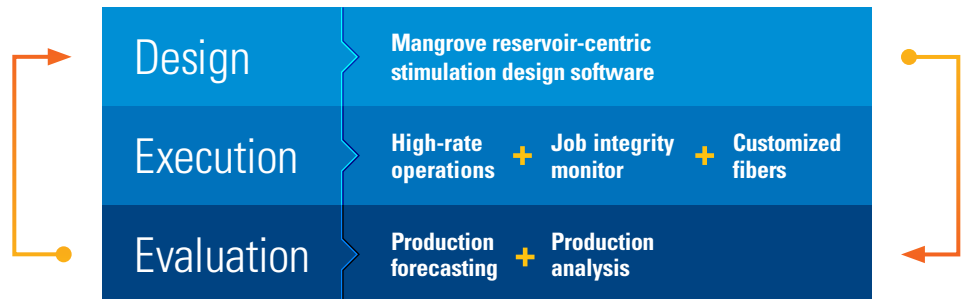
Based on more than 52 wells pumped in the Haynesville, Marcellus, and Barnett shales, HiWAY fracturing delivers equal or higher production than conventional treatments while using 32% less fluid and 42% less proppant.

Reduce risk of screenouts

HiWAY channel fracturing has been pumped in more than 490 stages in the majority of the major shale basins in North America without a single screenout.



Complex fracture network modeling capabilities enable Mangrove software to tailor HiWAY stimulation designs to the formation. This increases stimulated reservoir volume while reducing proppant and water consumption.



An integrated design-execute-evaluate process incorporates unconventional fracture modeling and customized design parameters to optimize HiWAY treatments in shale reservoirs.