SandCADE

Sand control design, execution and evaluation software

APPLICATIONS

- Design, execution, and evaluation of sand control treatments
- Gravel or frac packing of wells in circulating or squeeze positions
- Cased and openhole completions
- Vertical, deviated, and horizontal wells
- Wells completed with Alternate Path† technology
- Brine, polymer, and VES carrier fluids

BENEFITS

- Identifies and mitigates risks early with placement simulations
- Maximizes completion life and production with best pack efficiency
- Verifies pressure limit to ensure safety standard compliance

FEATURES

- Single package for both sand control tools and pumping calculations
- Support for both gravel-pack and fracturing simulations
- Multiple distinct modules covering every aspect of treatment design
- Fast simulations using pseudo-3D gravel placement
- Comprehensive postjob evaluation using advanced pressure and temperature data analysis
- Seamless integration with Schlumberger sand control tools and accessories

Sand control takes precision, which is why every Schlumberger gravel- or frac-pack treatment begins above ground—with SandCADE* software. This computer tool is an integral part of designing sand control treatments that reduce workovers and completion failures. SandCADE software allows Schlumberger to combine all the sand control completion elements and to design the ideal gravel-pack strategy before a job begins.

Simulating gravel-packing processes allows sensitivity analysis to be performed using various well, fluid, and hardware parameters. These simulations help operators evaluate completion intervals, carrier fluids, gravel sizes and concentrations, pump rates, downhole fluid leakoff, and returns at surface. Simulations are also used to optimize washpipe, screen, and service tool configurations.

SandCADE software provides the necessary platform to design, execute, and evaluate sand control completions to ensure production success.

Design

The powerful SandCADE engine allows the user to manipulate a variety of critical parameters to create the optimal solution for the well, whether cased hole or openhole. The software includes multiple simulation modules covering every aspect of the treatment design, from hardware configuration and deployment to gravel placement. SandCADE software uses data from friction flow-loop testing as well as field test data to provide friction modeling and optimization of the pumping design. This feature ensures that the pumping design not only meets the completion objective but also protects the integrity of the downhole equipment, such as Alternate Path screens.
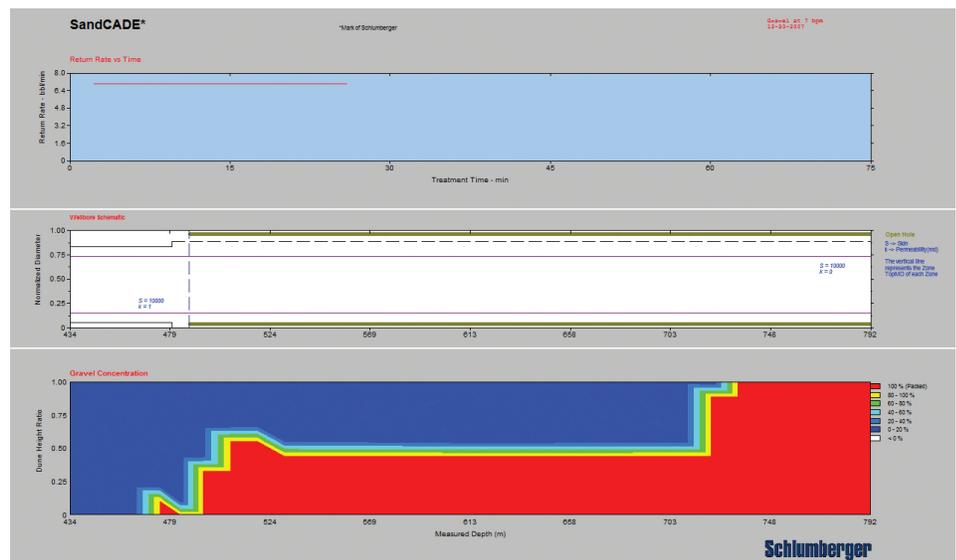
SandCADE horizontal openhole gravel placement simulation.

At the wellsite, Schlumberger uses the design to execute the plan. Tests run onsite use the data to fine-tune the design for optimal treatment performance. SandCADE allows models to be calibrated onsite with actual pretreatment test data to derive the most accurate simulation of the treatment possible, even before the proppant is pumped downhole. SandCADE then works in conjunction with the SandCAT* computer-aided treatment software to execute the plan according to the final design. Data continues to be acquired throughout the operation for detailed postjob evaluation.

SandCADE

Evaluation

With the SandCADE software suite, the job does not end at screenout. The postjob evaluation modules allow data to be automatically analyzed using advanced differential friction pressure and temperature derivative techniques. These techniques provide detailed insight into downhole mechanisms to demonstrate the success of the treatment, build knowledge and experience, and continuously improve the design and execution of future wells.

Unmatched versatility

SandCADE software is the only tool that fully handles cased hole, openhole, and Alternate Path[†] completions. It integrates seamlessly with Schlumberger sand control tools and accessories, including cased hole technologies and the Transcend* family of services for openhole completions.

SandCADE modules

SandCADE software includes multiple modules that cover every aspect of sand control treatment design.

Simulate circulating gravel pack treatments. The **Gravel Placement module** uses toolstring and pumping schedule information to simulate a circulating gravel pack. It evaluates design efficiency and estimates pressure values throughout the job. With support for multiple fluids and toolstring accessories, the module is well suited for both cased hole and long, horizontal, openhole gravel-pack treatments.

Design hydraulic fracturing treatments. The **PropFRAC* Placement module** is a numerical hydraulic fracture simulator for modeling fracture growth into layers above and below the pay zone along with fracture extension and recession. The simulation is based on the coupling of fluid flow into the fracture and rock mechanics. This coupling allows screenouts and slurry dehydration to be simulated.

Simulate frac-pack operations. Combining the Gravel Placement and PropFRAC Placement modules, the **STIMPAC* module** performs simultaneous gravel-packing and fracturing simulations, allowing the precise design of pressures and evaluation of sand control completion efficiency.

Maximize efficiency for both cased hole and openhole treatments. The **Alternate Path Design module** estimates friction pressures while the gravel or frac pack is being pumped through various Alternate Path configurations, thus supporting the AllFRAC[†] and AllPAC[†] Alternate Path screens and the OptiPac[†] Alternate Path system. The module predicts critical pressures and ensures that treatments can be performed within the operating envelope of the system.

Optimize fracturing design with actual test data. Preceding STIMPAC treatments, the **DataFRAC* module** collects pressure and flow rate data from a series of pumping tests. The data are analyzed to determine fracture-closure stress, fracture geometry, and fluid leakoff coefficients, which are used to optimize the treatment design.
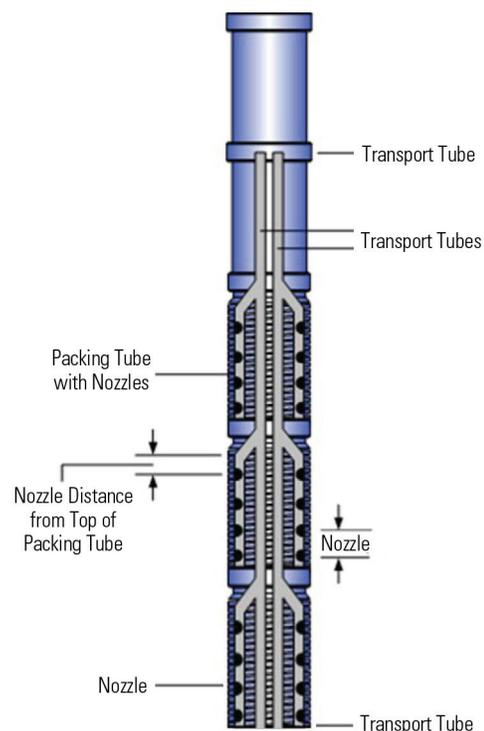
Remove subjectivity of manual pressure matching. Using numerical models based on the full range of fracture behavior parameters, the **Auto Pressure Match module** performs automatic pressure matching for hydraulic treatments. Overcoming the simplified assumptions inherent in analytical calibration treatment evaluation, it uses a convenient and reproducible logic for matching pressures.

Perform detailed postjob data evaluation. The **Downhole Data Analysis module** analyzes postjob surface and downhole gauge data using advanced differential friction pressure and temperature derivative techniques. It facilitates detailed postjob evaluation, which is used to improve the design and execution of future treatments.

Ensure reliable packer installations. The **Packer Hydraulics module** calculates job parameters to generate procedures for the safe running and setting of packers and the prevention of premature shifting and release.

Convert data from surface to bottomhole conditions accurately. The **Bottomhole Pressure module** converts surface treatment conditions such as pressure and pump rate to bottomhole conditions, and vice versa.

Optimize BHA to reach total depth. The **Torque and Drag module** simulates and analyzes friction coefficients and forces as the BHA is run in and pulled out of hole, optimizing the design to reach total depth.

Packing Tube with Nozzles
Transport Tube
Transport Tubes
Nozzle Distance from Top of Packing Tube
Nozzle
Nozzle
Transport Tube

OptiPac system in the SandCADE Alternate Path Design module.

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