

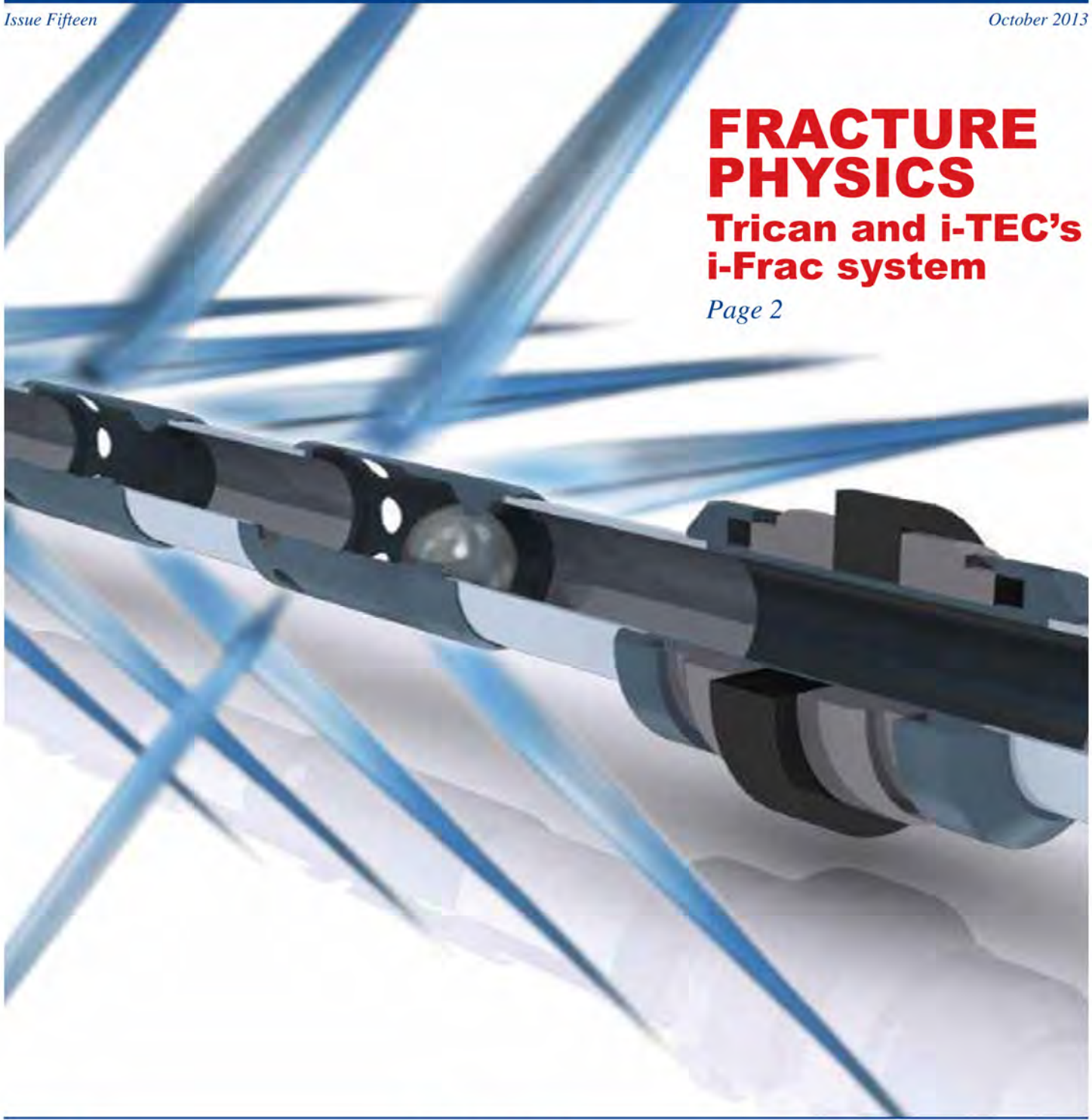
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Fracture physics

Trican and i-TEC's i-Frac system sets new records for scale and speed in hydraulic fracturing

DESPITE being a technology in its relative infancy, horizontal hydraulic fracturing techniques have changed the ways in which engineers and operators view production. Technologically, it is an area where new and innovative approaches in engineering have allowed operators to improve continually on efficiency and returns.

The concept behind Trican's i-Frac system was to create a very simple way of maximising the number of fracture initiation points in a wellbore. By employing ball drop and sliding sleeve techniques, the i-Frac system allows for up to 440 fracture sites – significantly higher than the industry standard of 50-60.

The system is flexible; Trican has worked with customers on both open-hole and cemented completion projects. Its experience is backed by a wealth of varied technological options to suit the needs of the customer and the requirements of the well and reservoir. In addition to the i-Frac system, Trican also offers the i-Can multi open/close sleeve that uses coiled tubing to mechanically shift the sleeve to open and close frac ports.



Since January, Norway's i-TEC Well Solutions has been integrated with Trican's existing completions business, leading to the successful uptake of the i-Frac and the i-Can sleeves across unconventional recovery projects in North America, Canada and the North Sea.

Process

Options for multistage perforation have previously included explosives or manual shifting valves, but these carry issues – namely safety risk and time, respectively. Using a ball drop method allows users to isolate multiple stages safely and more efficiently, whilst the i-Frac system also increases the number of fracture sites.

Once the well string is run, the i-Frac system is cemented as a normal casing and a wiper dart ensures that the internal pipe and ball seats are wiped free of cement. Alternatively, for open hole completions, an increase in pressure sets the isolation packers, and continued pressure isolates each i-Frac sleeve before opening the fracture ports.

The smallest i-Frac ball is then released, passing through each





stage until it reaches the corresponding i-Frac sleeve size. Here it will pass through and open each i-Frac sleeve in the stage – there can be between two and ten in every stage – until it reaches the final ball-seat, which does not allow it to pass. The pressure is then increased, and the stage is fractured. This is repeated for each zone, by dropping increasing ball sizes, sealing the stage before. Once every stage has been fractured, the formation is allowed to flow.

Advantages

As the practice of open-hole horizontal fracturing has grown, operators have become aware of the limitations of the open-hole method, especially with regard to ageing wells. These cemented completion systems allow the ability to re-frac in the future, and i-Can gives the option to open and close the well many times. Production is therefore managed effectively over the lifetime of the well.

Each string can be adapted for the requirements of the customer and their project. Recently, on an operation in the Bakken field, the i-Frac system was configured for a 35-stage procedure, undertaken

over a record 40 hours from start to finish. This represented a two- to three-day saving of time, and a corresponding cost-saving for the operator. In the Eagleford field, Trican successfully installed and fractured a record 118 sleeves over 23 stages in a single well.

In a North Sea completion, Trican was also the first ever Downhole Tool provider to deploy dissolvable frac balls in the multistage frac procedure.

Utilising these innovations in technology and engineering, Trican is aiming to expand its position across the Middle East, Russia and the Far East. Its success in unconventional completions, its inspired approach to recovery procedures and technology, and its versatility regarding the challenges of each project make Trican, i-TEC and the i-Frac system an efficient and proven partnership. ■

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