Frac Sand Screening Specialists

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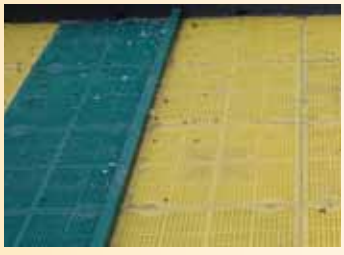

The industry leader in synthetic modular screen media, technology and systems since 1978

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Sand sculpting

A Wisconsin facility fine-tunes its scalping circuit with screen media that meets demand in the frac sand market.

BY CAROL WASSON

Wisconsin Industrial Sand Co. (WISC), a subsidiary of Fairmount Minerals, has the enviable task of meeting increasing demands for high-quality specialty sands in a variety of markets including glass, foundry, filtration – and particularly within its primary focus – hydraulic fracture (frac) sand for the oil and gas industry. WISC ships frac sand by truck and rail to states such as Arkansas, Colorado, New York, North Dakota, Oklahoma, Texas and Wyoming. These regions are hotbeds for hydraulic fracturing, or "fracking," which involves the use of horizontal drilling to allow for recovery of natural gas and oil from deep shale formations.

Frac sands are a proppant, meaning sized particles mixed with fracturing fluid are used to hold fractures open after a hydraulic fracturing treatment. The method of hydrofracing is the forcing of a concoction of frac sands, viscous gel and other chemicals down a well to prop open fractures in the subsurface rocks to create a passageway for fluid from the reservoir to the well.

If the frac sand grains are not strong enough or are not the right size, they won't effectively prop open the passageways. Considering the latter, producing quality frac sand is rather like a serious form of sand sculpting with specifications being extremely stringent.

At the WISC Maiden Rock mining site, which is one of only four underground industrial sand mining operations in the United

States, the company mines a rounded-grain "Northern White" sand prized for its strength and consistency. Although the facility is unique, it is similar to almost any other sand processing operation in that a common bottleneck may often be found in a screening circuit.

For Maiden Rock, that bottleneck was a 5-ft. x 12-ft. single-deck scalping screen that was compromising throughput owing to a lack of adequate open area. Also, the circuit is a wet scalping screen where water is first introduced to the dry sand to turn it into a slurry before continuing on to wet plant processing – and, with the lack of open area, too much usable sand was being flushed over the deck.

Above all, WISC Regional Manager Rich Budinger wanted to increase throughput and efficiency on the scalping circuit without having to opt for a larger screening unit. "We wanted to fine-tune and tighten down the deck

The success of Polydeck's Maxi screen panel design at Fairmount Mineral's Menomonie plant convinced management to use the same approach at Maiden Rock.

Screening Frac Sand

As the demand for frac sand has skyrocketed since 2000, driven by increasing shale gas production in several states, permitting for frac sand operations has also exploded. Uncertainty and confusion exists as to the most effective and economical way to screen and produce saleable frac sand. In addition to the scalping example in this article, some operators see savings in scalping even smaller and avoiding sending any coarse material to the dryer; for example, screening at 20 mesh. As shown in the table below, the product size desired varies but Polydeck offers panels with openings below 70 mesh, allowing conventional screening separations at very small sizes.

Frac Sand Size Designation	" 6/12	" 8/16	" 12/20	" 16/30	" 20/40	" 30/50	" 40/70	" 70/140
Nest of U.S.A. Sieves Recommended For Testing	4	6	8	12	16	20	30	50
	6	8	12	16	20	30	40	70
	8	12	16	20	30	40	50	100
	10	14	18	25	35	45	60	120
	12	16	20	30	40	50	70	140
	16	20	30	40	50	70	100	200
	Pan	Pan	Pan	Pan	Pan	Pan	Pan	Pan

Why Polydeck?

- We have extensive experience in frac sand applications, with hundreds of new decks and conversions in place;
- Our diverse product line offers the highest open area and the widest range of screen panel openings in the industry;
- We have experience with every major screen manufacturer to incorporate our fastening system into their frames;
- We offer the most comprehensive performance guatantee you can find. We call it *Performance. Guaranteed!*

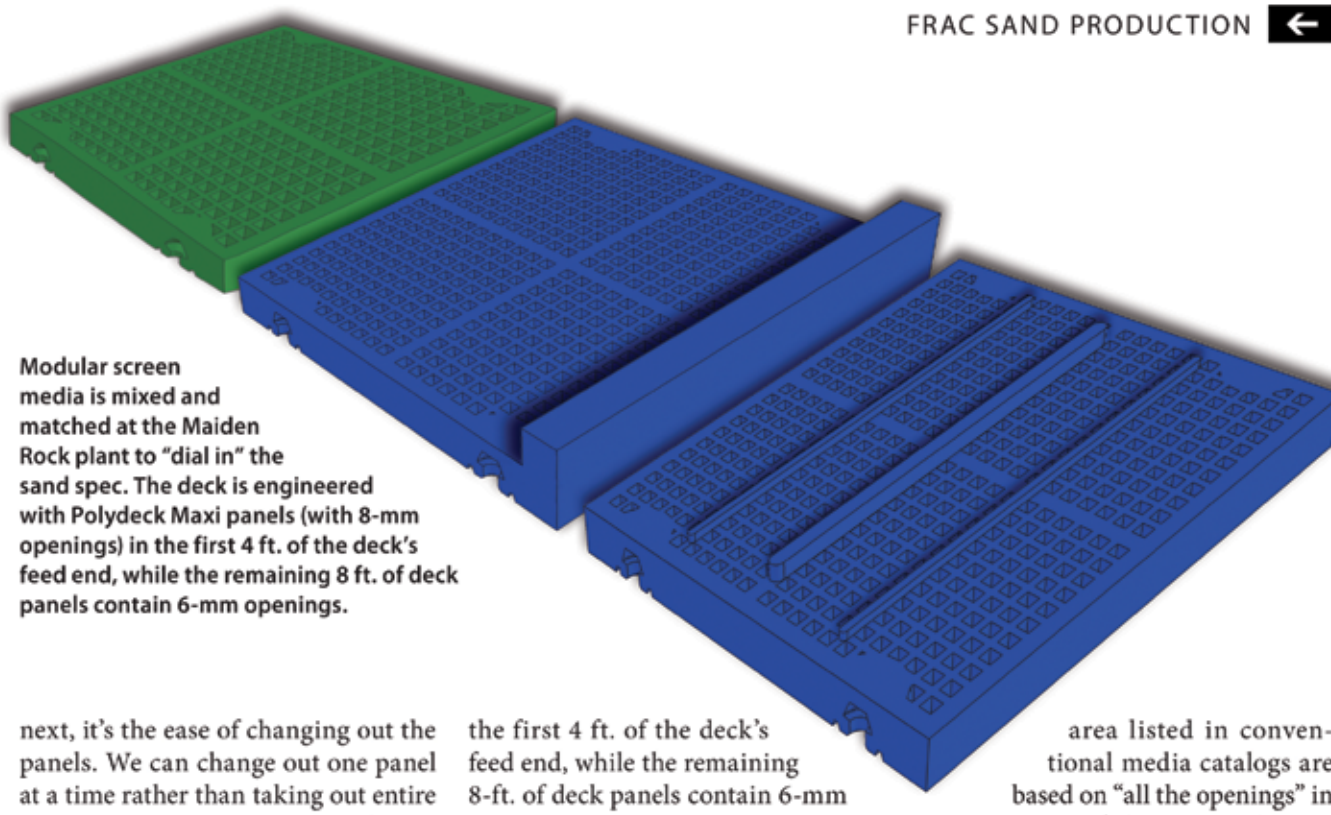
For increased efficiency and throughput, the Menomonie operation uses Polydeck Maxi panels on its double-deck scalping screen.

without having to buy a new screen. With our previous media, we couldn't use anything smaller than a 10-mm opening and that was a problem as we wanted a minus-8-mm cut," he says.

Going modular

While at a former workplace, Budinger says he had experience working with the product and applications engineers from Polydeck Screen Corp., manufacturer of modular urethane, rubber and specialty screening solutions. "When we started up our Menomonie, Wis.-based operation, which is above ground, we installed Polydeck modular panels on our wet screen there. So it made sense to consider the same at the Maiden Rock plant," he says.

Budinger explains that several factors drove the decision to go with a modular Polydeck urethane Maxi screen panel design. "First, it's the wear resistance of their urethane panels and



Modular screen media is mixed and matched at the Maiden Rock plant to "dial in" the sand spec. The deck is engineered with Polydeck Maxi panels (with 8-mm openings) in the first 4 ft. of the deck's feed end, while the remaining 8 ft. of deck panels contain 6-mm openings.

next, it's the ease of changing out the panels. We can change out one panel at a time rather than taking out entire sections. But most important is the significant increase in open area. With the way the panel is designed and the fact that the framework is smaller than that of other options on the market, the deck offers more openings per square foot than conventional media," he says.

FRAC SANDS ARE A PROPPANT, MEANING SIZED PARTICLES MIXED WITH FRACTURING FLUID ARE USED TO HOLD FRACTURES OPEN AFTER A HYDRAULIC FRACTURING TREATMENT.

The WISC team worked closely with Dick Stiles, Polydeck's Upper Midwest region manager, to analyze material characteristics, material flow, desired specifications and production goals to select the optimum screen panel design. "With the use of smaller screens, particularly in the underground operations, we have to utilize all the open area we can find," says Stiles, who explains that the new Maiden Rock scalping screen deck is engineered with Maxi panels (with 8-mm openings) in the first 4 ft. of the deck's feed end, while the remaining 8-ft. of deck panels contain 6-mm openings.

"Dams are installed at the spray bars, and typically all of the product passes within the first 4 ft. In order to meet future demands, the operation has the option of accessing an alternative deck entirely comprised of 6-mm openings, allowing them to fine-tune processing methods between the two decks as needed," he says.

Wide open

As to maximizing open area, Stiles explains that the percentages of open area listed in conventional media catalogs are based on "all the openings" in a section of the screen when, in truth, a good portion of those openings are blocked by bucker bars, crown rubber, clamp rails and center hold-downs, causing actual open area to be compromised by up to 40 percent.

"At the Maiden Rock plant, we combined our Maxi panel design, which allows more holes per square foot, with our PipeTop II frame system. This framework features unique half-inch-wide attachment rails versus the mounting styles on conventional frame systems that result in up to 3 in. of dead

Company overview

Fairmount Minerals, headquartered in Chardon, Ohio, is a group of companies with locations in the United States, China, Canada and Mexico. Fairmount Minerals' global operations include 11 mining and mineral processing plants and seven manufacturing coating facilities. It is one of the largest producers of industrial sand and has enhanced its core business through acquisitions and product development to better serve its markets.

Strategic acquisitions brought some of the country's most successful and experienced silica sand related technology companies together. These partners, who form Fairmount Minerals, have been continuously mining, processing and selling high-purity silica sand and related products since 1890. These facilities have molded the glass, foundry, golf course, landscape, oil and gas, industrial coatings, abrasives, play sand, and filtration markets.

Take note

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space where fines build up," he says.

Budinger says the Polydeck screen media has significantly increased efficiency and throughput at the fully automated Maiden Rock plant. He says the same can be said for the Menomonie plant, which also uses Polydeck Maxi panels on its double-deck scalping screen.

After the 8-mm-minus material passes the scalping screen, it is transferred to the wet plant, which consists of a series of cyclones and separators that rinse and dewater the material, while removing contaminants and fines. The wet sand is stockpiled for two to three days for further dewatering before being transferred to the dry plant where it is ultimately dried to 0 percent moisture. The sand is then separated into five gradations prior to shipment.

WISCONSIN INDUSTRIAL SAND CO. IS ONE OF MANY OF THE PARTNERING COMPANIES THAT FORM FAIRMOUNT MINERALS.

WISC is one of many of the partnering companies that form Fairmount Minerals, which has been continuously mining, processing and providing high-purity silica sand and related products since the early 1980s. **PQ**

Carol Wasson is a veteran freelance writer for the aggregates and construction equipment industries.