Trepanning Solves Holemaking Problems For Exotic Metals

by Debbie Dalton

A drill operator inspects a completed bore. In the center is the solid core produced by the trepanning method.

A close-up of a partially drilled cylinder's ID shows the core and cutting path made by a trepanner.

Although newer, exotic metals such as Inconel, Monel, Titanium and Hastalloy offer many important advantages for metalworking industries, manufacturers often waste valuable time, money and materials by not using them efficiently.

Industries that use tube products are particularly at risk. A high proportion of metal is wasted when machining tube from solid bar stock because conventional gun- and spade-drilling methods remove the center section as chips. Many steel mills require minimum orders as high as 8-10,000 pounds for processed tubes, and then may take 6-10 weeks to fill an order. Some mills will not even process certain alloys into tubes because it is not cost-efficient, while tubes in stock often will not meet the dimensions required for a particular job.

Realizing that an inco alloy can cost up to 4000% more per pound than basic carbon steel and that stainless steel can cost up to 750% more, conserving material becomes a necessity.

A solution is trepanning, the method of boring a hole through a solid bar by ... annular groove and removing ... there is little ... the

than conventional drilling, a trepanner can complete a job in less than half the time.

Trepanning is particularly useful with exotic metals. The high cost of these materials makes the process of trepanning more desirable because less of the exotic metal is lost.

Although exotic metals have many attributes, machining can be more difficult. Most industry sources agree that the only method to produce a hole in these materials effectively and efficiently is to trepan. Additionally, it can be more cost-efficient to trepan than to purchase a tube product.

Kathy Rutledge, spokesperson for Boring Specialties, Inc., a trepanning service company in Houston, TX, agrees. "I've heard customers comment, with surprise, that it is actually cheaper for them to buy a bar and have us trep... it than it is to buy processed tube.

"The primary advantage of trep... is retrieving the solid core," Ms. Rutl... continues. "One time when we were working with a customer, we utilized the same bar three different times. We started with an 8" OD bar and trepanned a 6½" ID. From the remaining 5" OD core, we trepanned a 3½" ID. Finally, with the remaining 2" OD core, we trepanned a 1"

ID. There was very little waste ... material."

This solid core can be useful in s... ways. Scott Swoverland of ... Stainless & Alloys in Dallas sa... company always saves the c... one of the benefits of tre... added bonus of a qualit... be reused.

An alternative i... scrap metal. By s... it is possible f... some of the... especially ... of their ...

Tre... bec... a... ... is not ... requires ... can't be prod...

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Trepanning eases contractors' pipe 'pains'

DEBBIE DALTON
Technical Writer
Houston, Texas

THE RECENT "discovery" of a cost-effective, high quality alternative to produce oil country tubular goods (OCTG) on an "as needed per job" basis has come to the rescue of many drilling contractors and other oilfield service companies besieged by economic difficulties.

The alternative is trepanning, the method of boring a hole through a solid metal workpiece by cutting an annular groove and removing a solid core (see sidebar).

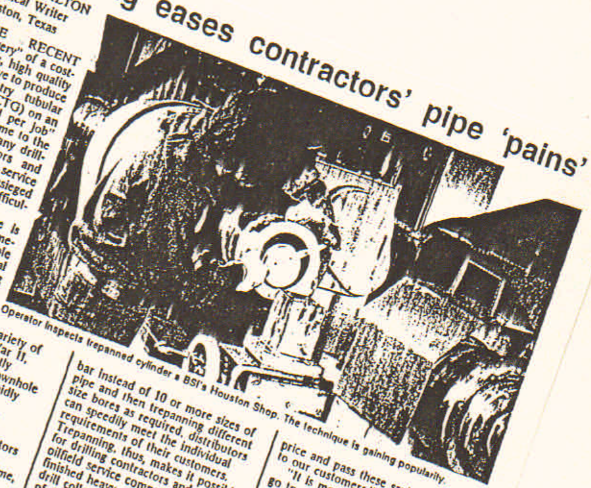
Although used in a variety of Industries since World War II, trepanning has only recently become available to the downhole drilling market and it is rapidly gaining in popularity.

Since the beginning of the current downturn, many oil companies and OCTG distributors streamlined their inventories to hold down costs. At the same time, several U.S. pipe manufacturers realigned and merged with other companies, making it even harder to get processed pipe. Steel mills, the typical source of OCTG, continue providing high quality pipe; however, a minimum order of 10,000-40,000 lbs and 14- to 17-week lead time for delivery are common requirements.

These factors combined to create the current, artificial shortage of pipe, catching drilling contractors in the middle: They could no longer anticipate the needs of their customers and plan ahead for possible jobs; yet, budgetary constraints and increased competition made it impossible for them to wait.

To cut lead time and tackle small as well as large jobs, trepanning has become not only a much-needed alternative, but also a necessity to remain competitive.

By purchasing solid bars and having them trepanned as needed, distributors can maintain an unlimited and less costly in... By stocking just one size



Operator inspects trepanned cylinder a BSI's Houston Shop. The technique is gaining popularity.

bar instead of 10 or more sizes of pipe and then trepanning different size bores as required, distributors can speedily meet the individual requirements of their customers. Trepanning, thus, makes it possible for drilling contractors and other oilfield service companies to have finished heavy-wall drillpipe, subs, drill collars and kellys in a matter of days and at a competitive cost.

Since most individual end users and distributors can't create the volume required to make trepanning cost efficient, specialized service companies are beginning to fill the niche. Houston-based Boring Specialties, Inc. (BSI) is one such company. By drawing clients from the drilling market as well as from other industries, the firm is now consistently working three daily shifts, a fact that allows it to provide quick turnaround at competitive prices.

Houston-based Hughes Drilling Equipment sold their trepanning machinery in 1986 because the volume of work did not warrant the additional staff needed to run the machinery, according to E.A. Prochaska, Manager of Business Development for Hughes Tool Co. Tool Joints and Associated Products.

"There's a ... such a...

price and pass these savings along to our customers."

"It is more economical for us to go to a trepanner than to keep staff on the payroll to run our machines," says a spokesman for Itag Products, Inc., a manufacturer of oilfield drilling equipment headquartered in Houston.

"I first realized this need for specialized service companies in the early '80s," said Charlie Elder, President of Boring Specialties, Inc. "Manufacturers who try to keep every department at full capacity are the first to succumb to the market; when one department suffers, the entire company suffers. By concentrating on trepanning and making it available to anyone who needs it, we can survive in a roller-coaster market."

Manufacturers, contractors and distributors trying to keep inventory low and cash available face problems from the steel mills, according to Elder.

"If they go ahead and ... the quantity of tub... mills require ... with it ...

The Trepanning Technique

by Debbie Dalton

Several factors, including the downturn of the oil industry, the closing of several large U.S. tubing manufacturers and competition from foreign manufacturers, have resulted in an increased need for oil industry services to be consolidated into specialized service companies. Companies specializing in trepanning, the method of boring a hole in a solid bar and removing a solid core, are becoming more of a necessity as tool manufacturers cut back on this particular machining technique.

"It is more economical for us to go to a trepanner than to keep staff on the payroll to run our machines," says Rickey Burch, sales manager for Itag Products, Inc., a manufacturer of oil field drilling equipment in Houston which distributes to North and South America.

Many oil tool manufacturing companies have been forced to cut back due to the downturn of the industry. An individual company providing trepanning services only for its own customers cannot create the volume necessary to make trepanning cost-efficient because the machinery is never working at a productive capacity.

Hughes Drilling Equipment, also in Houston, sold their trepanning machinery in 1986 because the volume of work did not warrant the additional staff needed to run the machinery, according to E.A. Prochaska, manager of business development for Hughes Tool Company, Tool Joints and Associated Products.

"There's a real need for services such as trepanning to be concentrated in one area," Prochaska said. "By using a service company for trepanning, we can get quality products at a competitive price; therefore, we are able to pass this savings along to our customers."

Service companies which focus on selected services, such as trepanning or spiraling for a broad customer base benefit not only their own customers ... they benefit the entire industry.

Boring Specialties, Inc., based ... Houston, is one such company. T... have one facility which only doe... panning. By drawing customers ... the entire marketplace, as well ... other industries, they are con... working at efficient producti... This allows them to prov... turnaround of quality pr... competitive price.

"I first realized this ... cialized service com... early eighties," says ... president of Boring ... "Manufacturers that ... department at full-c... to succumb to the ... department suffer... suffers. By co... thing—trepan... available to a... are able to s... market."

In the p... tubing m... States have g... it harder to get ... competition using the latest pro... equipment can provide quality tubing, however it is not uncommon to wait 16-21 weeks for delivery. Because most tool manufacturers and contractors cannot afford to wait that long, an artificial shortage of tubing is created. By purchasing bar stock, or drill collar blank material and having a service company trepan it, tool companies are able to have finished tubing, drill collars and kellys in a matter of days at a competitive cost.

Trepanning is a unique boring method used by a variety of industries including aerospace, petrochemical, oil and gas, and steel.

Because high-priced, non-magnetic metals must be used in drilling to ensure ...er readings from the instrumenta... ...hrough, trepanning takes ... Trepanning is ...netic

Henders...

This service ... customer as well as for ... company. "Keeping the inventory ne... is quicker and cheaper than trucking it back and forth," Elder said.

In these slow economic times, it is not wise to tie up a lot of cash in inventory.

"Purchasing solid bars allows us to maintain less inventory," said Prochaska. "By having Boring Specialties trepan different sizes of I.D., we can

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One tubing service niche: trepanning

By CHARLIE ELDER
Boring Specialties Co.

The economic downturn of the oil industry in the mid-1980s resulted in the discovery of a cost-effective, high-quality alternative to processed tubing.

Although trepanning, the method of boring a hole in a solid bar and removing a solid core, has been used in a variety of industries since World War II, it has become available only recently on an as-needed, per-job basis in the downhole drilling market. The availability of these services for individual jobs is increasing.

The industry downturn made it difficult for many companies to continue having the luxury of huge and costly tube inventories, forcing many oil companies and tubing distributors to cut back in an uncertain market.

These companies streamlined inventories to hold down costs. In addition, several large tubing manufacturers in the United States realigned and merged with other companies, making it even hard-

er to get processed tubing.

Steel mills, the typical source for tubing, continue to provide quality tubing; however, a minimum order of 10,000 to 40,000 pounds and a 14-to-17-week lead time for delivery is common.

These factors combined to create an artificial shortage of tubing. Drilling contractors were caught in the middle; they could no longer anticipate the needs of the petrochemical companies and plan ahead for possible jobs, yet budgetary concerns and increased competition made it impossible to wait.

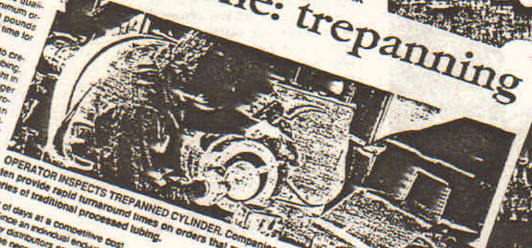
Trepanning was not only a much-needed alternative, but it also became a necessity to remain competitive. Today, trepanning is an accepted and valued alternative to processed tubing.

By purchasing solid bars and having them trepanned as needed, distributors can maintain an unlimited and less costly inventory. By stocking one size of solid bar instead of 10 different sizes of tube and then trepanning different-sized holes as required, distributors are able to meet the individual requirements of their customers.

Additionally, toll companies and contractors can have finished tubing, drill collars and kellys in a matter of days at a competitive cost.

Since an individual end-user and many distributors can't create the volume necessary to make trepanning cost-efficient, specialized service companies now fill this niche.

Hughes Drilling Equipment Co., Houston, sold its trepanning machinery in 1986 because the volume of work did not warrant the additional staff needed to run the machinery, according to E.A. Prochaska, manager of business development for tool joints and associated products at Hughes Tool Co.



OPERATOR INSPECTS TREPANNED CYLINDER. Companies which offer trepanning services can often provide rapid turnaround times on orders that may have otherwise had to wait longer for deliveries of traditional processed tubing.

"It is more economical for us to go to a trepanner than to keep staff on the payroll to run our machines," a spokesman for Itag Products Inc., a manufacturer of oil field drilling equipment in Houston that distributes to North and South America, said.

"For us, the time element is more important than the cost savings," said Glenn Schulte, value engineer for Elder Oil Tools, Yorktown, Texas. "Almost all of our jobs are done on a rush basis; we never have time to wait for a steel mill."

Trepanning is also a good choice for exotic metals because of its range of capabilities. Because of the nature of exotic metals, it can be as much as 15 percent cheaper to buy a bar and trepan it than it is to buy tubing. Additionally, solid bar in exotic materials is more readily available than tubing.

...n all metals, holes as small as one-eighth inch or as large as 12 inches in diameter are routine trepanning jobs. The solid core may be used again or sold for scrap.

Unlike the two types of processed tubing from a steel mill — cold-drawn and hot-rolled, trepanning ensures internal-diameter tolerance, and secondary finishing is usually unnecessary due to the trepanning technique. A trepanned product's finish can be equal to cold-drawn tubing but is almost always better than hot-rolled.

Many factors, including the high cost of inventories and low profitability of stocking drill collars, have caused many companies in the industry to seek alternatives. Because the trepanning process is quick, it has allowed these companies to remain competitive by meeting their customers' needs, while maintaining small, lower-cost inventories. ■

...rlie Elder is president of Boring ...ties Co., a trepanning company in ...

American metal market 4-22-91

Getting to the core of alloy trepanning

Tubular products in certain stainless and specialty alloys are difficult to find, but trepanned bar is more readily available.

BY DEBBIE DALTON

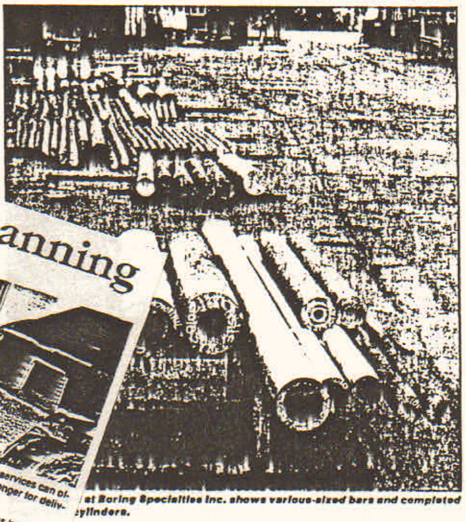
Since the early 1980s, exotic metals such as Inconel, Monel, titanium, and non-magnetic alloys have proved a necessity in various industries, particularly those that use tubular products. Their usage should continue to grow as more industries discover their benefits, which include strength, durability, and resistance to high temperatures and corrosion.

On the negative side, specialty alloys are very expensive (Inconel, for instance, costs substantially more than basic carbon steel), are difficult to ...rk with, and, in some cases, difficult ...tten certain alloys, including ... processed into a ...alloys that

Further, trepanning is cost-efficient from an inventory standpoint because solid bars are more readily available than tubing. A service center can stock one size solid bar instead of 10 different tubing sizes, having a hole trepanned in the bar to meet different customers' needs. Both the service

center and the customer benefit from this arrangement because the center can supply an unlimited inventory geared to each customer's specific requirements.

Additionally, exotic metals' high cost makes trepanning desirable because less of the metal is lost. For



...at Boring Specialties Inc. shows various-sized bars and completed cylinders.