A. GRANT HISTORY

On November 1, 1989, Pickard Line-up Boom Associates (PLUBA) applied for Financial Assistance from the United States Department of Energy. Thereafter, Notice of Award was given to PLUBA that Grant No. DE-FG01-90CE15476 had been approved for the project. The project period initially was identified as June 18, 1990 to December 17, 1991. Pursuant to permission from Glen Ellis with the Department, the project period was extended to December 17, 1992.

B. PROJECT TASKS

Attachment "A" to the Grant identified four tasks, as follows:

1. Task 1: Construct the Pickard Line-up Boom.
2. Task 2: Select 12 pipeline contractors and set up lease agreements with them for field testing the Pickard Boom.
3. Task 3: Proceed to test the line-up boom and to instruct the 12 pipeline contractors and their operating personnel in proper on-the-job use of the boom.
4. Task 4: Prepare final report for DOE.

C. REPORT OF PROGRESS ON EACH TASK

During the grant period and with the assistance of DOE grant funds, PLUBA successfully completed Task 1, construction of the Pickard Boom. PLUBA contracted with Sawyer Manufacturing Company (1031 North Columbia Place, Tulsa, Oklahoma) to construct the new boom.
General information concerning the Pickard Boom is set out on Attachment "1". The new boom constructed by Sawyer is superior to the original prototype constructed before the grant period. The most significant technical improvement made by Sawyer concerned the control box, for remote operation of the boom.

After completion of the new boom by Sawyer, the boom was successfully tested by PLUBA, thereafter PLUBA attempted to obtain lease agreements with pipeline contractors (Tasks 2 and 3). A promotional/instructional video of the boom was prepared and used for marketing purposes. Contractors expressed interest in the safety and productivity advantages of the boom. However, the Pickard Boom eliminates the need for two to four pipeline personnel. The union has opposed the Pickard Boom on this basis. Contractors working on pipeline projects in the United States have been unwilling to challenge the union.

Toward the end of the project period, PLUBA entered into a license/marketing agreement with Sabre International with the objective of first securing contracts outside of the United States. Once this is achieved and the Pickard Boom is used successfully in the field, it is believed that pipeline contractors may be more willing to use the Pickard Boom in the United States.

DISCLAIMER

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PICKARD LINE-UP BOOM
General Description

The Pickard Line-up Boom is a device for controlling the placing together of the ends of two sections of pipe for clamping and welding. Consistently better weld quality is possible because the optimum weld space is achieved and held constant throughout every stringer bead, regardless of the welding method. With the use of the Pickard Line-Up Boom, there will be a minimum of pipe movement while the stringer bead is being run. Since the welder can rely on conditions being the same throughout the weld, he can regulate the weld to eliminate backwelding almost entirely.

The boom consists of a platform with skid rack, a turntable, a rectangular telescoping boom with three sleeves, a spacing head, and a power package. The platform is mounted on the front or rear of the tractor. The turntable is bolted to the platform and provides a strong base for the rectangular boom. This makes it possible to keep the boom at right angles to the pipe. The rectangular boom has a spacing head attached to it. The spacing head is designed to clamp the pipe from the top, and it can be activated independently to make small, horizontal changes in the position of the incoming joint of pipe. The boom has an effective vertical travel of ten feet and a horizontal reach of approximately fourteen feet. These dimensions can be customized.
to suit the needs of the customer. The Pickard Line-up Boom can be adapted for pipe insulation, handling of joint fill material, lay barge operations, and other specialized application. The boom's hydraulic power system minimizes maintenance in the field and prevents costly downtime. Various functions of the boom include vertical boom up-down, rotate, extended and retracted clamp/unclamp, and boom flotation.

The operator shares the control of the boom with a member of the ground crew called the spacer. The spacer has a remote control box which he can use to activate the spacing head. A hydraulic cylinder built into the neck of the clamp is actuated by the spacer to make fine horizontal changes in the position of the incoming joint of pipe. This insures proper spacing at the pipe joint. Also, if a bent joint of pipe is incorrectly positioned in the sling, the spacer can rotate it, to reposition it without setting it down. Otherwise, it would be necessary to set the joint back on the skids, reset the sling and pick it up again --- all lost time.
SPECIFICATIONS

ENGINE:
Model - Wisconsin TJD
Continuous Rating - 18.2 HP @ 3400 RPM

HYDRAULIC PUMP:
Model - Vickers V101P5S12B10
Gal/Min @ 3400 RPM - 14.7 GPM

PROPORTIONAL CONTROL HYDRAULIC VALVES:
System Requirements
Filtration - 25 Micron absolute (10 nominal)
Operating Fluid - Petroleum base hydraulic oil
Operating Temperature - 0° to 180°

Technical Data
Deadband - 30% of full signal
Internal Flow - 0.5 GPM Maximum @ 3000 PSI
Coil - 50 ohms, 0 to (+ or-) 4VDC @ (+ or -) 80 MA

CHECK VALVES:
Six (6)

FLOAT CONTROL VALVES:
Two (2)

RELIEF VALVE:
One (1)

FUEL TANK (Gasoline)
Capacity - 10 gallon

HYDRAULIC TANK:
Capacity - 12 gallons

System Pressure - 1500 PSI
Clamping Force - 2000 lbs.

Dimensions in retracted state:
Height - 7.5 Ft.
Width - 7 Ft.
Length - 16 Ft.
Weight: 6700 lbs.
PI_CARP LINE-UP BOOM
FEATURES AND BENEFITS

There has long been a need for a tool that will improve the fit up and spacing phase of pipeline welding. After extensive development and testing, the Pickard Line-up Boom has been developed to serve this need.

Wherever field joints are required, this boom facilitates the handling of pipe, especially large diameter pipe. A forty foot joint of 42" diameter .625 wall pipe weighs approximately 11,000 lbs. and can swing dangerously when suspended from a moving tractor. Four separate axes of movement actuated by precise electro-hydraulic controls enable the Pickard Line-up Boom to rigidly clamp the pipe at a point in front of the sling to provide accurate control as the pipe is moved or brought into position around the line-up clamp.

The boom can be fitted to the front of the side boom tractor for use in set-up and set-in operations, or on the rear end of the side boom tractor for use in bending operations. The Boom is supplied with a skid rack. Specific advantages of the Pickard Line-up Boom include:

1. Positive control of large diameter pipe to
   a) Eliminate dangerous end to end swing especially when the tractor comes to a halt, and
   b) Eliminate dangerous swaying motion when moving along pipeline.
2. Controlled movement of pipe joints:
   a) Vertical pipe up/down
   b) Pipe rotation
   c) Horizontal in/out
   d) Boom rotation about a 50° arc
3. Ease and safety in spacing using a secondary remote control box.
4. The ability to stabilize and align bent pipe. Whether front
   or rear mounted, easy loading of pipe into the bending machine.
5. Control during uphill/downhill movement of pipe.
7. Fully automatic controls for the side boom operator.
8. Floatation mode which provides automatic raising/lowering of boom with the raising/lowering of the load line.
9. Automatic leveling of head with advanced electrical control.
10. Clamping head which automatically returns to the central position after releasing pipe.
11. Pads designed to conform to the shape of the pipe causing the least possible damage to the coating.
12. Enough power to allow break out for spacing while the internal clamps are in the expanded mode.
14. When laying pipe parallel with the ditch line it is often necessary to correct the direction of the last joint laid. To change the direction of the pipe it is often necessary to lift the pipe section high off of the 1st, 2nd and 3rd set of skids in order to change its lateral direction.

This often results in the cracking of the stringer bead. When the contractor is using the Pickard Boom on his pipe laying tractor. All that is necessary is to raise the pipe section off of the first set of skids 4" to 6". Then the operator extends or retracts the Pickard Line-up Boom outward or inward as the situation requires. At the same time the operator will release the load line synchronizing it with the travel as the Pickard Boom extends or retracts.

When the pipe joint reaches the point where they want to set it down the operator stops the extension or retraction of the boom and lowers the load line placing it on the skids. This maneuver positively eliminates 100% possibility of cracking the stringer bead. This manoeuvre also results in positive control of the pipe section with no danger of losing control of it.
Pipe laying by remote control introduced

By DAVID R. MILLION
Journal Staff Writer

A Tulsa's idea — born 42 years ago — that could save thousands of lives and millions of dollars in the oil and gas industry may soon reach the market place.

Kenneth Pickard began dreaming of a way to make pipeline construction quicker, safer and less expensive than the method used in 1909 when he entered the oil patch and still in use today.

Pickard, now 74, had an idea in 1949 that he is just now able to build and test his pipe boom with an $80,000 grant from the U.S. Department of Energy.

Use of the boom will eliminate the need for several workers and at least one tractor that costs about $6,000 per month, he said.

The boom is attached to a tractor and can handle a wide range of pipe diameters with hydraulic "jaws" of varied sizes controlled remotely.

"Once in place, the pipe won't move. That's the key — non-movement. That allows the welders to make a good weld the first time. And, that saves money. It costs between $7,000 and $12,000 to cut a weld out and re-weld it," he said.

The boom also eliminates the need for all but one man on the ground near the pipe who can make adjustments by remote control at a safe distance without touching the pipe, said Pickard.

It can save lives, Pickard said, because it holds a section of pipe being moved on skids before it is welded, as it is moved into position to be welded and finally into the ground.

For decades, pipe has been moved by tractors equipped with a cable. It takes two or more men to control the pipe's movements. If the cable breaks or the pipe moves unexpectedly, a man can be crushed, Pickard said.

"I've seen a lot of men injured and more than a dozen killed that way," said Pickard.

In single two and a half hour period, it was only Pickard's quick action that kept him from being killed three times when pipe attached to cables swung wildly, he said. "And, there have been several other occasions when I was nearly injured or killed."

Pickard said he thought there must be a safer and more efficient way early in his career, which began in 1939 after hitch-hiking from Tulsa to Rollings, Wyo. for his first job.

"The idea came to me while we were trying to develop automatic welding equipment for a pipeline company, but I found out quickly I'd have to have a lot of money to develop the idea."

Pickard said he developed the automatic welding idea and obtained a patent for the company he was working for.

The boom prototype now under construction by Sawyer Manufacturing Co. in Tulsa, isn't Pickard's first. In 1978 he was able to develop it to the point of obtaining a patent in 1981 and an improvement in 1984.

"I'd work on the Trans-Alaskan pipeline and made and saved enough money to work on my idea," his career has led him all over the United States, Canada and several countries overseas.

Pickard did the basic design and hired Marvin Barber of the Paul King Co. in Tulsa to polish it, he said.

G. Price of Dewey built a prototype about 11 years ago. Pickard has used that equipment on several jobs and has made several changes as he watched it being used. Pickard applied for the development grant after attending an energy department workshop last November in Washington to help inventors convert ideas into products and market them.

The grant will pay for the prototype production and found a program that allows a dozen pipeline contractors to use the boom with little or no cost to them, Pickard said.

Once a contractor uses the device, he'll be convinced to buy one, said T.J. Hawkins, a Tulsa insurance man and one of Pickard's partners. An out of state businessman and Pickard's son, Joe, are also partners.

A few days use of the boom should allow a contractor to get use to the boom operations. "I guarantee once he is, he'll keep it the rest of that job, because he'll see the money the boom can save him," said Pickard.

Kenneth Pickard demonstrates his boom. (Journal staff photo)
Local Invention Improves Pipeline Safety

Story and Photo
By Bruce Curtis
Chronicle Staff Writer

Local inventor Kenneth L. Pickard spent last week in Washington, D.C., at the invitation of the U.S. Department of Energy.

He was one of 12 inventors invited from across the nation to attend a five-day commercialization planning workshop to help energy-related inventors develop a plan to market their inventions. Pickard is the inventor of the Pickard Boom, which he has deemed "The Pipeliner's Friend." The boom is a result of his many years of working on pipelines and saving co-workers hurt and killed because a section of pipe could not be controlled.

"I've been at this game for a long time. I saw a lot of things happen and wished that there was some sort of device that had positive control over a single joint being carried by a tractor up and down the right of way."

He says his boom provides that control and thus increases safety.

Holding Tight

The Pickard Boom is mounted on the front of a tractor. Various sizes of jaws are used to handle pipe being installed on a project.

The boom rigidly holds a joint of pipe being installed to assist welders. With the use of electro-hydraulics, the boom's controls, which may be adjusted to any position or permit bending of the pipe.

Pickard has spent many years in various capacities working on pipeline projects throughout North America, including Alaska and Canada, and many projects overseas.

His functions have included welding, welding supervising, line laying, pipeline inspection and other areas.

Reducing Danger

He says pipeline construction is still done much like it was 30 to 40 years ago. When a section of pipe is moved, either down the right of way to string it out or to get it in position to be installed, workers must walk along to steady the pipe as a tractor moves it.

Pickard vividly remembers when in New Hampshire when a pipe started swinging wildly.

He said the man, trying to steady the pipe, was lifted into the air as the pipe suddenly began swinging when the tractor carrying it hit something in the right of way.

When the tractor hit another object in the right of way, the pipe came down and struck the man across his forehead, killing him.

With the Pickard Boom mounted on the front of a tractor, Pickard says no one has to manually touch the pipe until it is in position to be installed in the pipeline. Pickard has seen this also eliminates misalignment of the joint.

"There is no way it (the pipe) can move. You can run a perfect weld every time."

If a joint is badly misaligned, it must be welded on the outside and inside of the pipe which he says wastes time and money. A joint usually is welded only on the outside.

Other Advantages

The boom also eliminates much of the stress placed on welds when the pipe is moved to the ditch.

"With the Pickard Boom, the pipe is kept straighter and moved less, reducing the stress placed on the welded joints. That's probably one of the greatest advantages as well as safety features," the inventor says.

The boom, he says, can save a contractor money in many ways.

Pickard says that when moving the pipe with the boom there is no need for an extra tractor either towing or helping push.

"This saves the cost of renting the tractor, paying the operator and buying the fuel for the tractor."

Efficiency also is a big savings feature.

"As soon as the personnel using it is acquainted with it, they can lay at least 25 percent more joints a day. On top of that, they'll never have defects in their stringer beads (initial weld on a joint) unless it is the fault of a welding rod or welding machinery."

He says an official from the U.S. Bureau of Standards estimates that with three months of use, the savings could pay for the price of a boom.

Pickard plans to sell the boom for about $90,000.

Simple to Operate

He says an operator can learn to use the boom efficiently within three days.

"It isn't complicated to learn how to use it. Once a contractor uses that boom for a stretch of 50 miles, I don't believe he'll ever do without it. He'll either try to buy one or lease one."

The boom has been used in projects in New York, Louisiana and Pennsylvania. Pickard says contractors for each project were pleased with its performance.

Development of the boom began in 1968 when Pickard first got an idea to develop an automatic welding machine. He says he knew, however, that he needed something else to stabilize the pipe before the automatic welding machine could work properly.

He got a patent on the automatic welding machine but didn't develop the boom until later.

"I never could get enough money from anybody to help me to develop the automatic welder."

Building a Production Model

By 1977 Pickard had saved enough money to start working on his boom. He got a patent in May 1981. About a year ago, Pickard applied for an $80,000 grant with the U.S. Bureau of Standards. The grant will be used to build a production model. He received approval just recently and is making his final application.

The Department of Energy is requesting a draft of technical improvements and anything else that is needed to get the boom ready for commercialization. It also wants to know how soon he can get ready and what costs will be involved.

Pickard says he has a business plan that he hopes the DOE will approve. He plans to attend a workshop Pickard attended should help.

It was conducted by Mohawk Research Corp., a firm which has done extensive work in commercialization technology by individuals and small companies. Costs were handled by Virginia Polytechnic Institute.

The faculty was comprised of specialists in various areas of technical and marketing expertise.