



JAWS

J. RAY McDERMOTT AUTOMATIC WELDING SYSTEM

Overview

The J. Ray McDermott Automatic Welding System (JAWS) is a third generation system combining state-of-the-art technologies in welding, servo systems and computerized controls. Originally designed in the mid-70s, the system was modified and first used by J. Ray McDermott (JRM) in 1982. The equipment was upgraded in 1993 with six welding heads, a patented laser tracking system and the ability to use the Pulsed Gas Metal Arc Welding (GMAW-P) process.

Successful projects worldwide have proven the durable system's ability to produce high quality welds at excellent rates of production. JAWS capability strengthens JRM's place as a world leader in the pipeline industry.

Quality with Various NDT Requirements

Welds made with JAWS equipment have met requirements of API 1104, Section 6, API 1104, Appendix A and DNV Rules. Non-destructive testing of JAWS welding includes radiography, manual Ultrasonic Testing (UT) and Automated Ultrasonic Testing (AUT).

JAWS Benefits

- Pulsed Arc (PGMAW) process offers improved penetration and reduces the potential for incomplete sidewall fusion
- GMAW-P process also produces less weld spatter, reduces porosity and increases deposition efficiency
- Six welding torches at each station provide exceptional production rates
- Programmed welding parameters eliminate operator adjustments
- Easily maintained and reliable with very little equipment downtime
- Excellent mechanical properties

Research & Development

JAWS development and support is centered at the Automatic Welding Facility in Morgan City, Louisiana. JAWS equipment is assembled, tested and refurbished at this location. Welding proce-



JAWS on Derrick / Lay Barge KP1

dures development, as well as procedure and welder qualifications can be handled at this facility. A similar facility in Batam, Indonesia supports Eastern Hemisphere projects.

JAWS History

The upgraded version of JAWS was put into service in the Spring of 1995 on the critical Shell Mars pipeline project. Installed on JRM's Derrick/Lay Barge DB-28, the system successfully laid the specified X70 grade pipe.

In 1996 the system was used in Malaysia on the Esso Production Lawit project. This 30 in. x .787 in. wall thickness line was laid in record time. Production peaked at 329 joints in one day - a world record for 30 in. single-joint production.

With additional enhancements, JAWS again set a world record in 1999 on the Premier Yetagun pipeline in Myanmar. The project was completed far ahead of schedule with peak production reaching 424 single joints in one day on 24 in. x .688 in. wall thickness pipe.

Two more records were set on the Conoco West Natuna Transportation System (WNTS) project in Indonesia in 2000. Production on the 28 in. x .642 in. trunkline peaked at 6.95 km reaching 382-60 ft. joints in one day. Then, production hit a record 492-40-ft. joints of 22 in. x .508 in. pipe on June 4, 2000; an average cycle time of less than 3 minutes.



JAWS



JAWS Control Cabinet



Weldhead with Patented Laser Tracking



R & D Facility in Morgan City, LA

AUTOMATIC WELDING JAWS SYSTEM HISTORY

| INSTALL. DATE | PROJECT | PIPE SIZE | LINE LENGTH (Miles) |
|---------------|---------------------------|----------------------|------------------------|
| N/A | British Petroleum | 36" | 99.42 |
| N/A | Loop | 48" | 21.13 |
| N/A | Pemex | 48" | 62.14 |
| N/A | Loop | 48" | 37.28 |
| 1982 | Esso Malaysia (EPMI) | 24" x .600" | 122.42 |
| 1982 | British Gas | 36" x .625" | 18.02 |
| 1983 | Statoil – Statpipe | 28" x .812" | 128.63 |
| 1983 | Statoil – Statpipe | 30" x .875" | 68.98 |
| 1984 | Statoil – Statpipe | 30" x .875" | 101.91 |
| 1985 | Statoil – ULA | 20" x .563" | 44.12 |
| 1987 | Norsk Hydro – Oseberg | 28" x .875" | 66.49 |
| 1987 | Statoil – Gullfaks | 36" x .812" | 6.84 |
| 1989 | Norsk Hydro – Togi | 20" x .752" | 28.58 |
| 1991 | EPMI – Kerteh to Jerneh | 28" x .688" | 144.16 |
| May 95 | Shell – Mars | 24" x .562" | 54.06 |
| May 96 | EPMI – Lawit | 30" x .787" | 137.33 |
| Apr. 97 | Marathon – Nautilus | 30" x .577" | 52.20 |
| July 97 | Chevron – VGS | 24" x .480" & .517" | 52.82 |
| Aug. 97 | Dauphin Island Gas System | 24" x .452" | 59.03 |
| Apr. 98 | Amoco Trinidad | 40" x .765 & .852" | 60.90 |
| Oct. 98 | Mobil NSO "A" | 30" x .625" | 63.38 |
| Dec. 98 | Premier Yetagun | 24" x .688" | 128.01 |
| Jan. 00 | Conoco West Natuna | 28" x .575" & .642" | 294.54 |
| May 00 | Conoco West Natuna | 22" x .508" | 44.74 |
| Apr. 03 | Ras Laffan Ras Gas | 38" x 1.07" to 1.16" | 58.14 |
| | | Total: | 1955.27 |