

Safety

Deepwater



DEEPWATER CHALLENGES DEEPWATER SOLUTIONS FROM SURFACE TO 10,000 FEET

Solutions

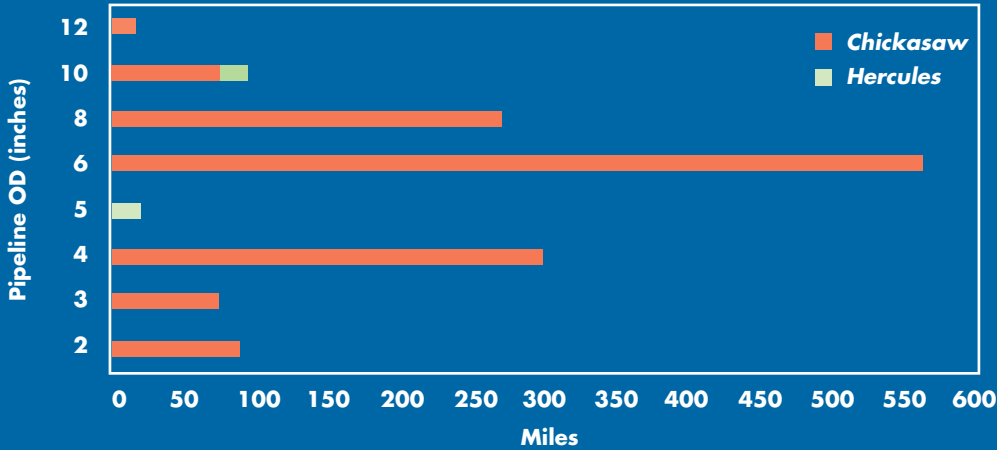
Experience



Select Deepwater Project Experiences Over

| CUSTOMER | VESSEL | PROJECT NAME | LOCATIONS | | | | LENGTH (Feet) |
|------------------|-----------|-----------------|-----------|------------|-----------|------------|------------------|
| | | | FROM | W.D. - FSW | TO | W.D. - FSW | |
| Shell Deepwater | Chickasaw | Popeye | GC 116 | 2034 | ST 300 | 337 | 123,700 |
| Shell Deepwater | Chickasaw | Tahoe II | MP 252B | 250 | VK783/828 | 1750 | 123,500 |
| Shell Deepwater | Chickasaw | Mensa Glycol | MC 685 | 5325 | WD 143 | 1750 | 329,000 |
| Marathon | Chickasaw | Arnold | EW 963 | 1790 | EW 873 | 766 | 84,500 |
| Walter Oil & Gas | Chickasaw | | EW 1006 | 1900 | EW 873 | 766 | 58,000 |
| Shell Deepwater | Hercules | Petronius Oil | VK 786 | 1750 | MP 289 | 340 | 221,800 |
| Texaco E&P (NO) | Hercules | Petronius Gas | VK 786 | 1750 | MP 252 | 285 | 63,400 |
| Mariner Energy | Chickasaw | Pluto | MC 674 | 2900 | SP 89 | 420 | 151,000 |
| Walter Oil & Gas | Chickasaw | | EW 878 | 1520 | GI 115 | 366 | 77,500 |
| Amerada Hess | Chickasaw | Tulane | GB 72 A | 1058 | GB 158 | 539 | 49,000 |
| Kerr McGee | Chickasaw | Nansen | EB 602 | 3755 | EB 602 | 3875 | 10,000 |
| Kerr McGee | Chickasaw | Boomvang West | EB 643 | 3755 | EB 602 | 3875 | 19,600 |
| Kerr McGee | Chickasaw | Boomvang East | EB 643 | 3755 | EB 642 | 3875 | 34,500 |
| Kerr McGee | Hercules | Boomvang/Nansen | EB 643 | 3755 | EB 688 | 3875 | 5,000 |
| Shell | Hercules | Manatee | GC 155 | 2020 | GC 155 | 2020 | 27,000 |
| Samedan | Chickasaw | Lost Ark | EB 421 | 2750 | EB 110 | 650 | 142,000 |
| BHP Billiton | Chickasaw | Boris | GC 237 | 2400 | GC 237 | 2120 | 32,000 |
| Ocean Energy | Chickasaw | Zia | MC 496 | 1850 | SP 89 | 422 | 84,500 |
| Ocean Energy | Hercules | Zia | MC 496 | 1850 | SP 89 | 422 | 84,500 |
| Williams | Hercules | Gunnison | GB 668 | 3100 | GA A-244 | 350 | 501,600 |

Chickasaw/Hercules Reeled Pipe by Miles in Gulf of Mexico

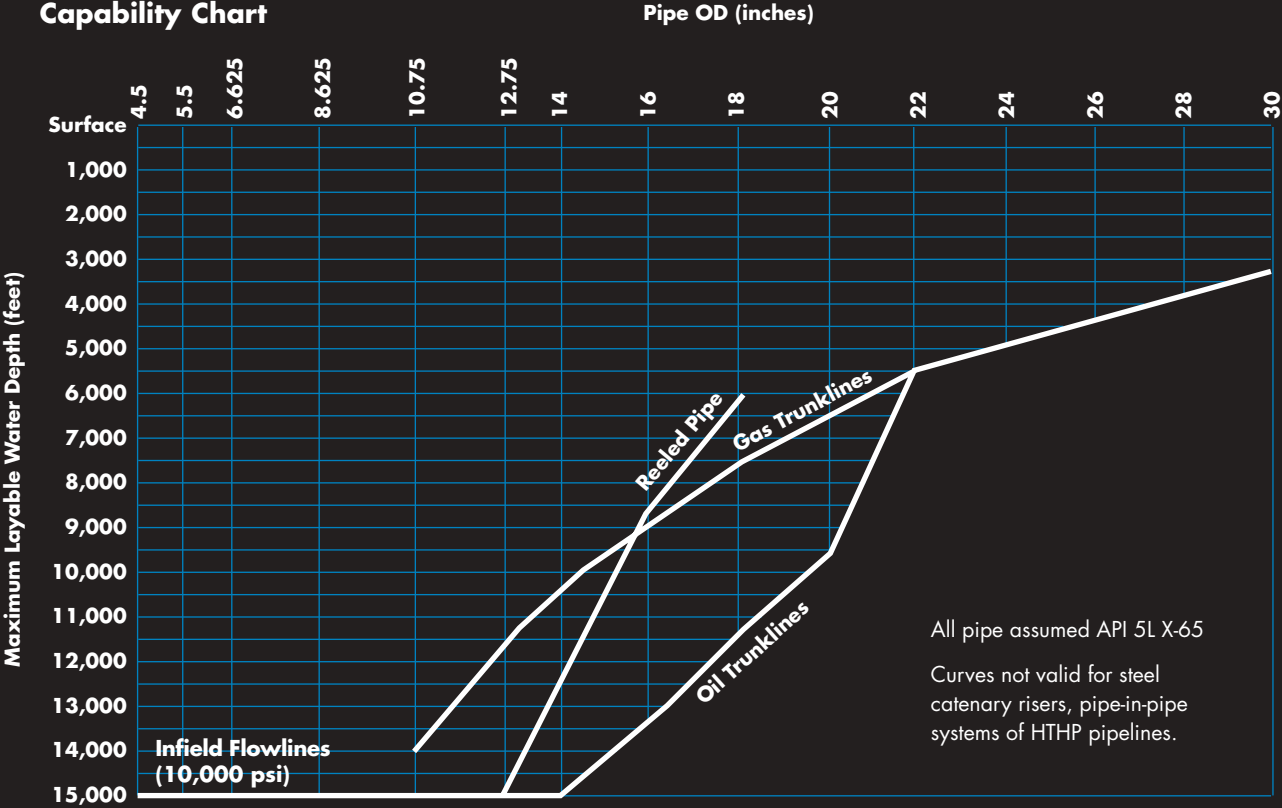


ver 1,000 Feet

| SIZE (In) | QTY | INSULATED | Pipe-in -Pipe | END TERMINATIONS | | COMMENTS | DATE |
|--------------|-----|-----------|------------------|------------------|----------|---|------|
| | | | | FROM | TO | | |
| 6 | 2 | No | No | PLET | Riser | Reel Lay 47.4 Miles Subsea Tie-back | 1994 |
| 4/8 | 1 | Yes | Yes | PLET | J-Tube | Reel Lay 4/8" PIP 23.4 Miles Subsea Tie-back | 1997 |
| 3 | 1 | No | No | PLET | Riser | Reel Lay 62.3 Miles, Stab & Hinge Over Initiation | 1997 |
| 6/10 | 1 | Yes | Yes | PLET | J-Tube | Reel Lay 16 Miles Subsea Tie-back, 6/10" PIP | 1997 |
| 4 | 2 | No | No | PLET | SSTI | Reel Lay Dual 4" to common PLET Subsea Tie-back with Umbilical | 1998 |
| 16 | 1 | No | No | PLET | Riser | 2525 FSW Max. W.D., Conventional Lay wet to Petronius Tower, Pioneer Jumper installation | 1998 |
| 12 | 1 | No | No | PLET | SSTI | Conventional Lay 12 Miles to Petronius Tower, Pioneer Jumper installation | 1998 |
| 8 | 1 | No | No | PLET | Riser | Reel Lay 28.6 Miles Subsea Tie-back with Umbilical | 1999 |
| 2 | 1 | No | No | PLET | Riser | Reel Lay 14.7 Miles 4.5" Pipeline | 2001 |
| 6 | 1 | No | No | PLET | Riser | Reel Lay 9.3 Miles 6" SS Tie-back | 2001 |
| 6 | 2 | Yes | No | SPAR | PLET | Reel Lay Dual 1.9 Miles SS Tie-back, 2 PLETs | 2001 |
| 6 | 2 | Yes | No | SPAR | PLET | Reel Lay Dual 3.7 Miles SS Tie-back, 2 PLETs | 2001 |
| 6 | 2 | Yes | No | SPAR | PLET | Reel Lay Dual 6.5 Miles SS Tie-back, 2 PLETs | 2001 |
| 6 | 2 | No | No | SPAR | Flowline | Reel Lay Wellstream 6" Bore Flex Risers | 2001 |
| 6/10 | 2 | Yes | Yes | PLET | PLET | Reel Lay Dual 5.1 Miles 6/10 PIP Subsea Tie-back | 2002 |
| 6 | 1 | No | No | PLET | J-Tube | Reel Lay 27 Miles Flowline SS Tie-back with Umbilical, flexible SCR & Umbilical | 2002 |
| 5 | 1 | Yes | No | PLET | Riser | Reel Lay 6.1 Miles 5" Insulated Flowline Subsea Tie-back With Umbilical, Flexible Riser & Jumpers, SDU, Subsea Manifold, Stab & Hinge Over Initiation | 2002 |
| 5 | 1 | Yes | No | PLET | J-Tube | Reel Lay 16 Miles Subsea Tie-back | 2003 |
| 5/10 | 1 | Yes | Yes | PLET | J-Tube | Reel Lay 16 Miles Subsea Tie-back | 2003 |
| 18 | 1 | No | No | SPAR | Riser | Conventional Lay 95 Miles Oil Pipeline, 60' joints | 2003 |

Global Industries is a leading international offshore construction contractor. Global provides offshore construction, engineering, and support services including pipeline construction, platform installation and removal, as well as diving and subsea services to the oil and gas industry in the Gulf of Mexico, West Africa, Asia Pacific, Middle East/India, South America, and Mexico.

DLB Hercules Pipelay
Capability Chart



Deepwater Expertise



One of Global Industries' core competencies is the installation of deepwater pipelines and their related components.

Global focuses on:

- ❖ Conventional and reeled installation of pipelines and umbilicals using the *Hercules* and *Chickasaw* in deep and ultra-deep water
- ❖ Multi-Service Vessel (MSV) support for jumpers, umbilicals, and subsea intervention using the Dynamically Positioned (DP) vessel *Pioneer*
- ❖ In-house deepwater design and analysis of pipelines, SCR's, and related subsea components
- ❖ Effective project planning and successful project execution through the use of online project management procedures using International Organization for Standardization (ISO 9000) guidelines



Global has installed over 1,450 miles of reeled pipelines since 1987, more than any other marine contractor in the Gulf of Mexico.

Systems

Worldwide Project Management

Global Deepwater Project Management offers many advantages:

- ❖ Dedicated attention to customer needs
- ❖ Focus on all project stages from estimating to commissioning
- ❖ Efficient and cost-effective project planning and execution
- ❖ High level project control systems

Under the leadership of an experienced Director - Deepwater Project Management, the project team meets customer needs, schedules, and specifications so as to ensure customer satisfaction and successful project execution.

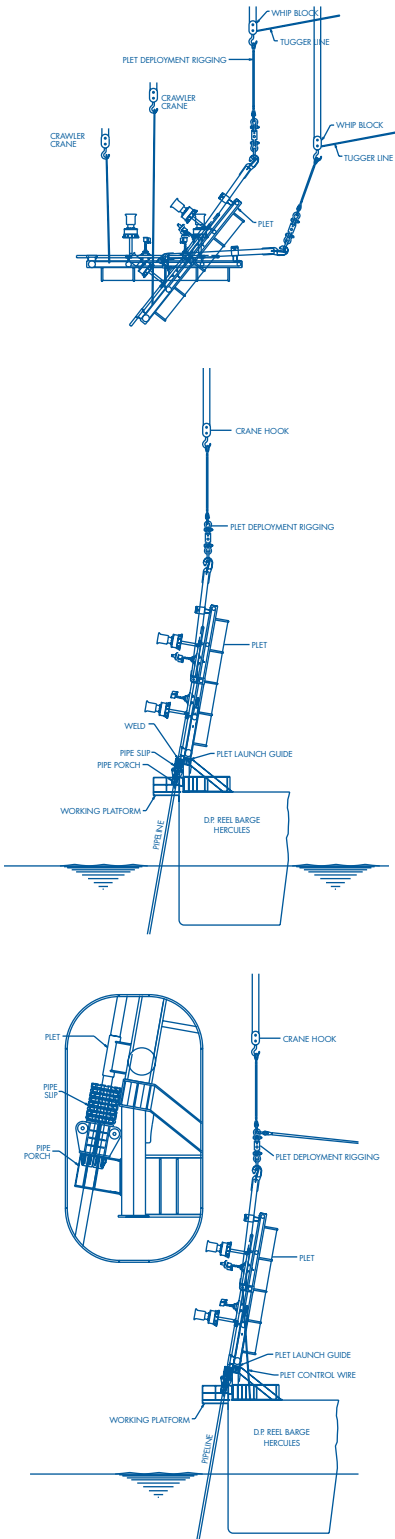
Global has developed additional performance management tools to streamline every project from start to finish including two powerful software packages named *Global Star* and *Global Sky*. These two proprietary systems work in concert to enable online up-to-the-minute review of bids, project control reports, vessel activity, and daily productivity reports. All to ensure productivity is monitored and schedules are adhered to.

Project Controls

Project Controls provides online project support to Deepwater Project Managers with in-house systems incorporating the fundamentals of cost engineering and schedule control to provide meaningful, credible reporting tools that support the project status and forecast.

Services include cost forecasting, planning and scheduling, cash flow analysis, marine productivity analysis, and change order management.

- ❖ *A pipeline end termination (PLET) is carefully lowered onto supports, called goal posts, in preparation for installation.*







QA/QC

Global provides construction and support services that consistently meet customer and regulatory requirements and enhance customer satisfaction through application of our Quality Management System. The Company is committed to using ISO 9000 as the basis for conducting its worldwide operations.

Health, Safety, and Environment

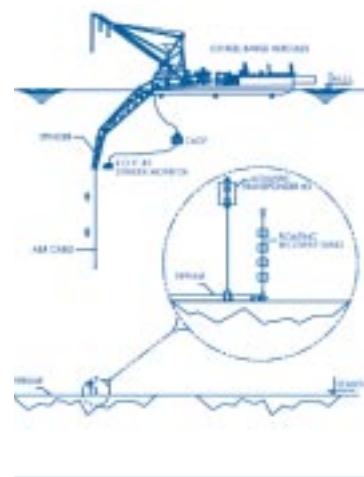
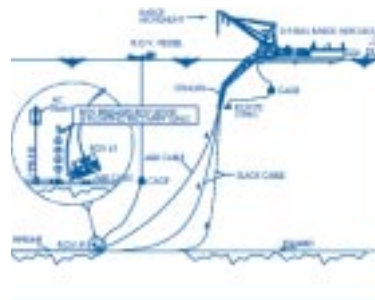
Global is committed to making safety, health, and environmental considerations the top priority. The Company protects and promotes the safety and health of its employees while protecting the environment.

Six tools are used as the standard safety process on each project:

- ❖ Hazard Assessment Safety Action Plan (HASAP)
- ❖ Job Safety Analysis (JSA)
- ❖ Safety Observation Report (SOR)
- ❖ Safety Sampling
- ❖ Formal Accident Investigation
- ❖ Measurement and Data Analysis

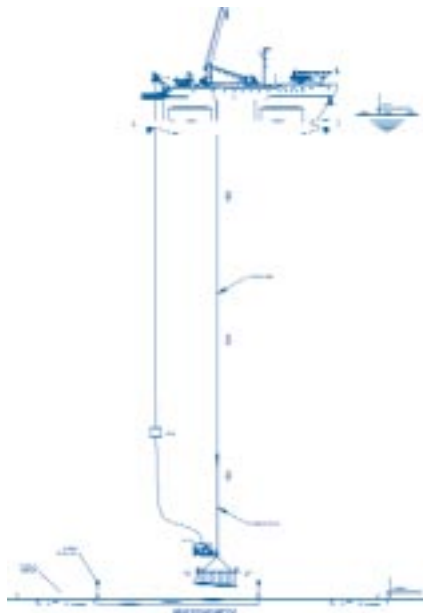
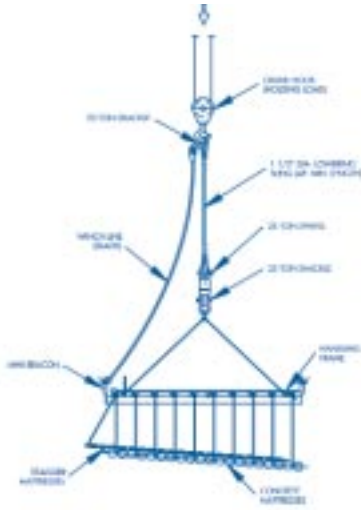
In addition to industry-standard programs and as part of its HSE Improvement Plan, Global offers or requires:

- ❖ Safety Observation Program (SOP)
- ❖ Additional HSE Training for Employees
- ❖ Special HSE Training for Supervisors
- ❖ Short Service Employees Safety Program (SSE)
- ❖ Contractor Management Safety Plan for Subcontractors
- ❖ Helicopter Underwater Evacuation Training (HUET)
- ❖ Marine Safety Survival Courses



The Hercules' 7,500-ton capacity horizontal reel is a distinct advantage over vertical reels. The vessel also executes conventional pipelay up to 60 inches in diameter.

Engineering & Deepwater Technology



Global Industries has centralized its Engineering and Deepwater Technology personnel in Houston, Texas. These personnel bring engineering design, analysis, project management, and an average of over 15 years experience, primarily in deepwater technology, to the table.

More importantly, the personnel in the field bring over 30 years of successful experience in conventional and reel pipelay in all water depths for successful project execution.

Pipeline Engineering

- ❖ Deepwater Pipeline and Riser Design
- ❖ PLET/PLEM Design
- ❖ Evaluation of Pipeline Stability Under Environmental Loading
- ❖ Conventional Riser and Steel Catenary Riser (SCR) Design and Installation

Construction Engineering

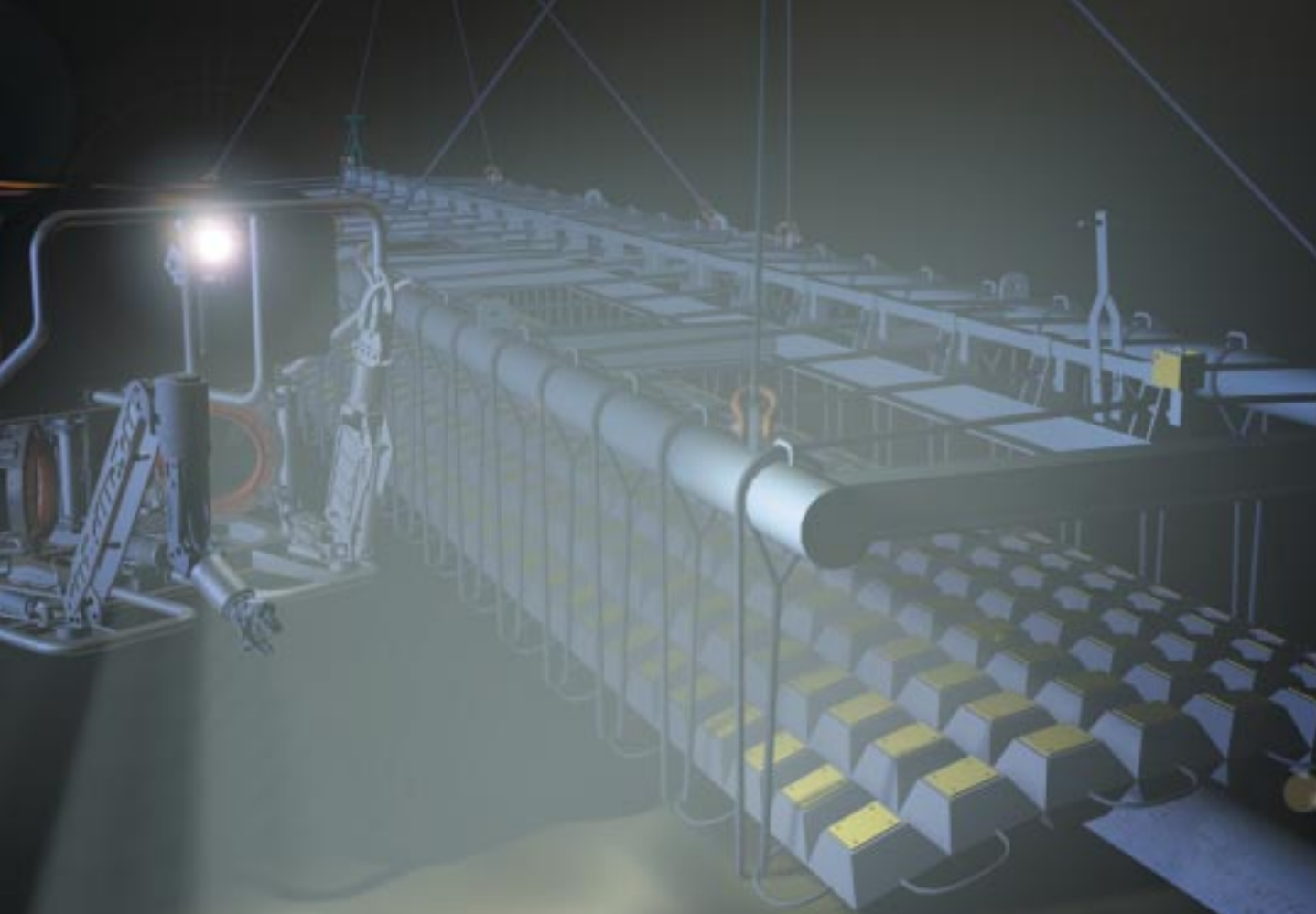
- ❖ Pipelay and Diving Procedures
- ❖ Lift Rigging Design and Analysis
- ❖ Design of Crossings/Beach Pulls and Shore Approaches
- ❖ Seafastening Design
- ❖ Transportation Analysis
- ❖ Structural Installation Engineering

Welding and Metallurgical Engineering

- ❖ Development and Qualification of Weld Procedures
- ❖ Engineering Critical Assessment (ECA), Fracture Mechanics
- ❖ Field and Laboratory Investigation of Defects
- ❖ Fracture Mechanics Analysis
- ❖ Joint Industry Studies and Welding Research and Development

Computer-Aided Drafting Design (2-D and 3-D)

- ❖ Structural Assemblies and Details
- ❖ Procedural Drawings
- ❖ Deck and Jacket Loadout and Seafastening Details
- ❖ Piping and Equipment Arrangements, Sections, and Assemblies

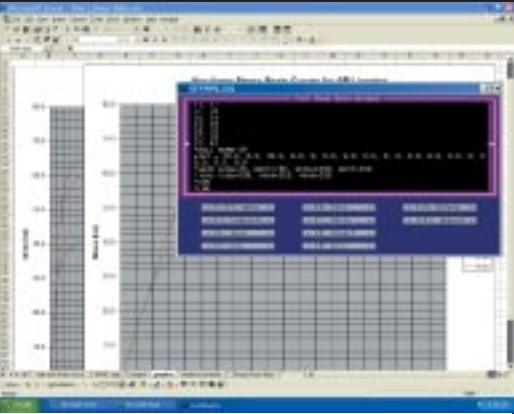


Concrete precrossing mats (above) are typically installed by the twin-hulled MSV Pioneer (below).

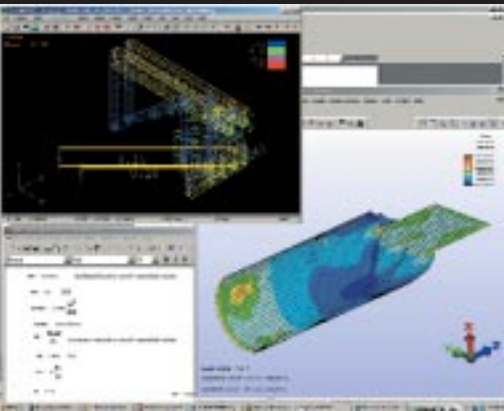


Engineering Software and Analysis

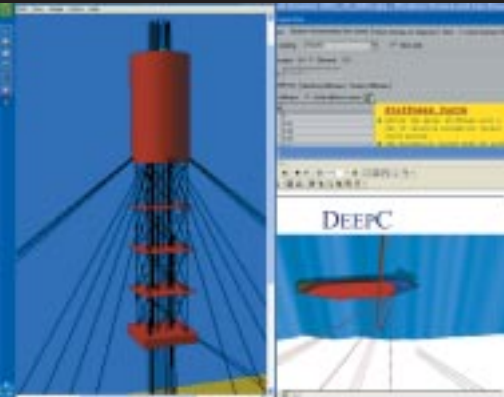
Engineering analysis capabilities provide the majority of analysis and design activities required to support our marine construction projects as well as pipeline design.



Non-linear static and dynamic pipelay analysis capabilities for strain-based designs (for deep and ultra-deep water pipelay) are possible with the use of licensed programs OFFPIPE and RIFLEX. Fracture mechanics applications (like pipeline ECA's) are analyzed using the licensed program CRACKWISE from TWI.



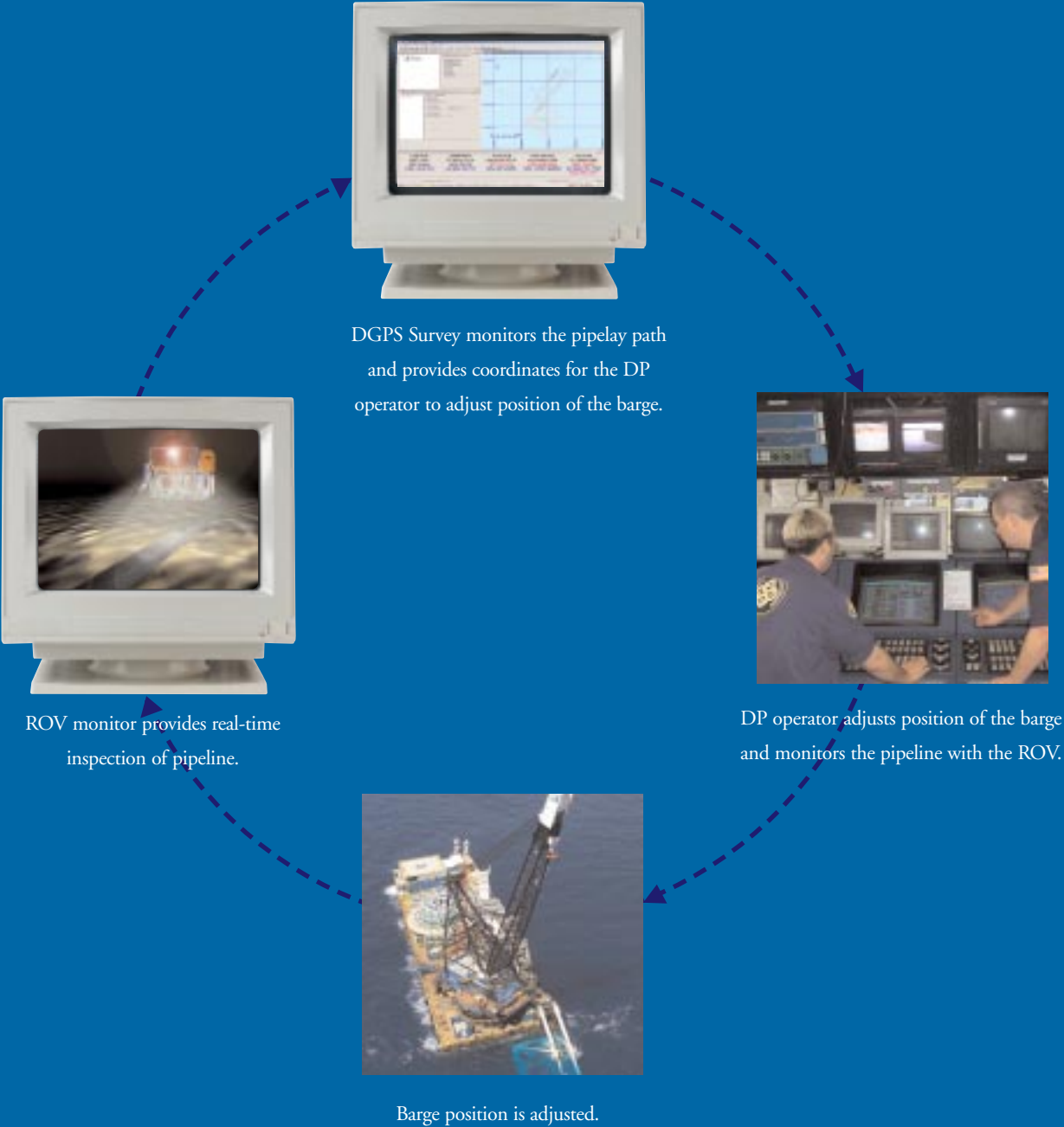
Global uses a variety of linear and non-linear structural analysis programs to analyze and design both installation aids and project components. SACS, MOSES, ALGOR, and StruCAD 3D are currently popular licensed programs available to our engineers. Other supporting software includes GRL WEAP, the AGA pipeline stability program, and a wide variety of spreadsheet applications developed in-house by our own engineers.

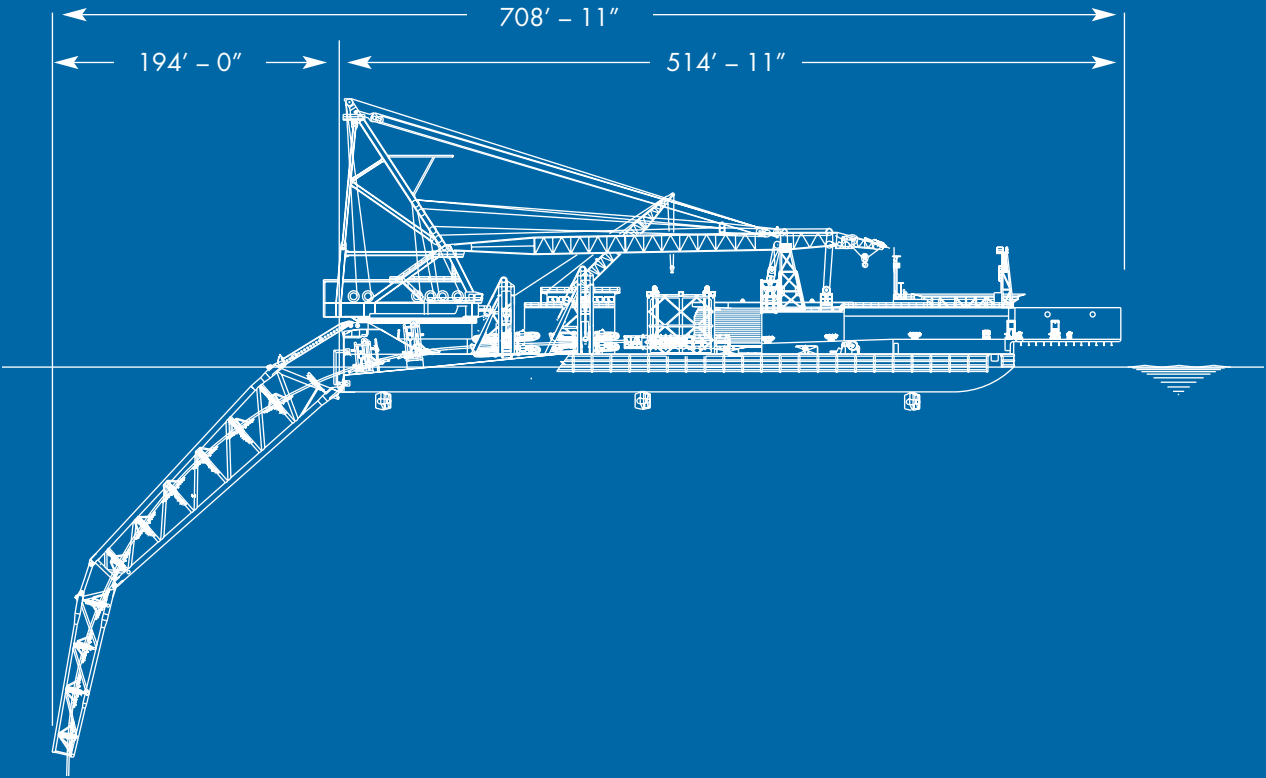


Global Industries' installation of this well-known licensed SESAM package from DNV is capable of modeling floating bodies, mooring analysis, coupled riser analysis, multi-body coupled simulation of marine operations, etc. Additionally, our DeepC licensed software has detailed hydrodynamic modeling capability (WADAM) and can perform coupled analysis of slender structures. Pipelines and risers, umbilicals, etc., can be independently analyzed using the licensed program RIFLEX. Marine operations including dual lifts can be analyzed using SIMO, a licensed software.

Integrated Systems

Correct pipeline positioning is crucial to any project. Global's integration of ROV monitoring, acoustic survey, surface positioning, and DP systems assures accurate pipelay.





Offshore Capabilities

Welding Technology

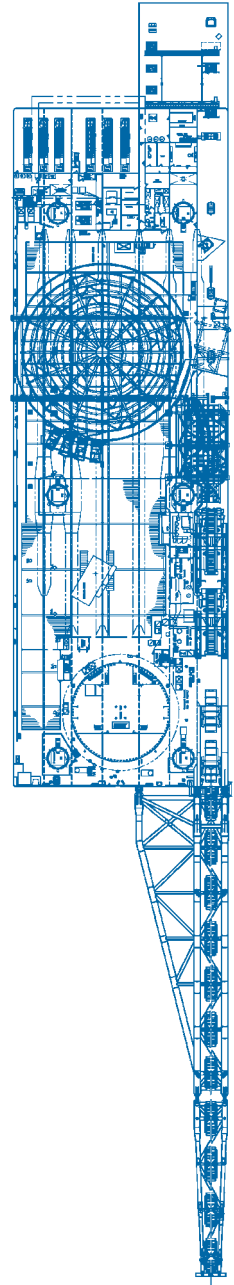
High strength steel pipe up to X70, as well as any pipeline for deepwater installation, requires higher integrity mechanized welding techniques than those produced using a manual shielded metal arc weld (SMAW) process. Global Industries has invested the personnel and dollars necessary to offer advanced mechanized welding to its customers.

- ❖ Global offers several types of mechanized and manual welding to weld pipelines used in reel or conventional pipelay including mechanized gas tungsten arc welding (GTAW). Global also offers gas metal arc welding (GMAW) and flux core arc welding (FCAW).

- ❖ Global's mechanized welding procedures provide strict controls over welding parameters that produce exceptional weld quality and integrity. Welds produced following Global procedures meet industry performance standards such as those of Det Norske Veritas (DNV) and American Petroleum Institute (API), as well as evaluation under engineering criticality assessments (ECA's).

- ❖ Global has state-of-the-art facilities specifically dedicated to welding technology: a 6,000-square-foot laboratory devoted to developing and testing weld procedures, metallurgical testing, pipe-bending machines for compatibility testing of weld properties to pipe properties, and a 2,790-foot pipe assembly rack used to assemble up to half-mile stalks of pipe.

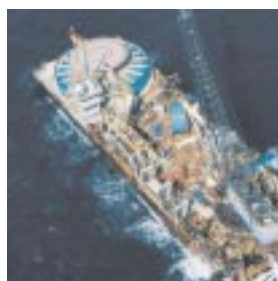
- ❖ ❖ ❖ *Mechanized flux core arc welding (FCAW) is used in Global's spool base.*



Deepwater Vessels



Hercules



Chickasaw



Titan 2



Pioneer

Hercules – Conventional & Reel Pipelay Barge

- ❖ Length 515 feet
- ❖ Width 140 feet
- ❖ Depth 25 feet
- ❖ Deck Space 30,000 square feet
- ❖ Quarters 206
- ❖ Pipe Diameter up to 60 inches
- ❖ Pipe Length up to 80 feet
- ❖ Lift (short tons) 2,000 tons
- ❖ Reel Capacity 85 miles of 6-inch to 10 miles of 18-inch pipe
- ❖ Tensioners 2 at 600 kips for 1,200 kips capacity
- ❖ Deepwater Stinger Cantilever truss type 316 feet (displacement control)
- ❖ Abandon/Recovery 440 kips capacity (planned 1,200 kips)
- ❖ Wire 3.5 inch diameter
- ❖ Thrusters (6) Retractable Azimuthing 3,000 HP DC, 504 kips total thrust

Chickasaw – Reel Pipelay Barge

- ❖ Length 275 feet
- ❖ Width 80 feet
- ❖ Depth 20 feet
- ❖ Deck Space 3,000 square feet
- ❖ Quarters 73
- ❖ Pipe Diameter up to 12 inches
- ❖ Lift (short tons) 125 tons
- ❖ Reel Capacity 45 miles of 4" to 3.8 miles of 12"
- ❖ Tensioner 180 kips
- ❖ Deepwater Stinger 136 feet with 80° departure
- ❖ Winch 7,000 feet x 2" wire
- ❖ Thrusters (2) Retractable Bow Thrusters 550 HP each
(2) Retractable Stern Thrusters 750 HP each

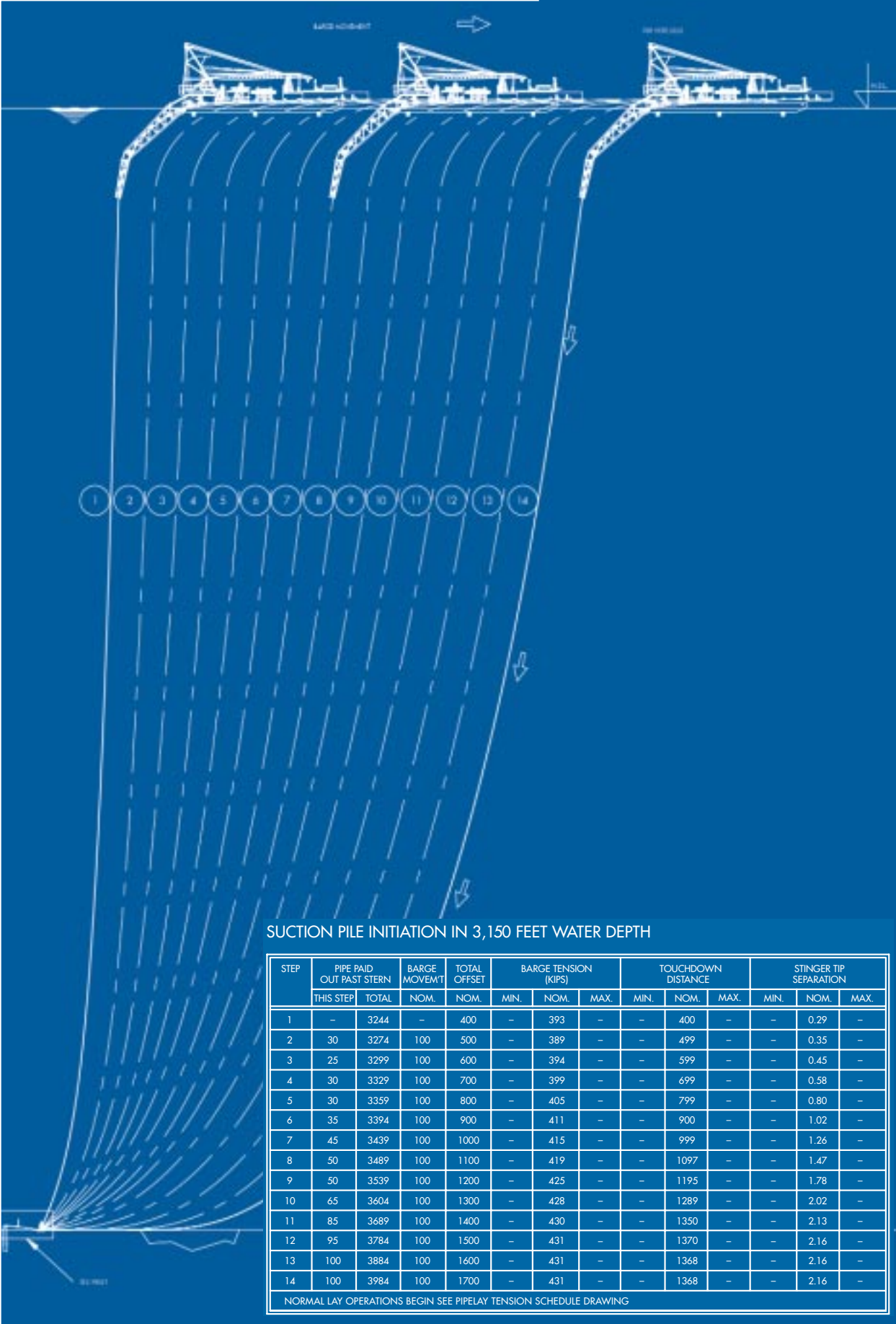
Titan 2 – Catamaran – Self-propelled DP Crane Vessel

- ❖ Length 456 feet
- ❖ Width 178 feet
- ❖ Depth 43 feet
- ❖ Deck Space 50,000 square feet
- ❖ Quarters 326
- ❖ Crane 880 short tons
- ❖ Thrusters (2) Full Azimuthing Proplulsion Thrusters 2,340 HP each
(8) Outdrive Full Azimuthing DP Thrusters 1,000 HP each
(2) Bow Thrusters (Tunnel Mount) 500 HP each

Pioneer – Catamaran – Self-propelled DP Vessel

- ❖ Length 211 feet
- ❖ Width 87 feet
- ❖ Depth 47.5 feet
- ❖ Deck Space 9,000 square feet
- ❖ Deck Load 400 to 550 short tons
- ❖ Quarters 64
- ❖ Small Diameter (up to 4.5") Rigid Pipe & Coiled Tubing
- ❖ Simultaneous ROV & Diving Services
- ❖ Saturation Diving to 1,500 FSW
- ❖ Hook-up & Inspection Services
- ❖ Thrusters (4) 800 HP each Z-Drives

Suction Pile Initiation in 3,150 Feet Water Depth



SUCTION PILE INITIATION IN 3,150 FEET WATER DEPTH

| STEP | PIPE PAID OUT PAST STERN | | BARGE MOVEMENT | TOTAL OFFSET | BARGE TENSION (KIPS) | | | TOUCHDOWN DISTANCE | | | STINGER TIP SEPARATION | | |
|------|--------------------------|-------|----------------|--------------|----------------------|------|------|--------------------|------|------|------------------------|------|------|
| | THIS STEP | TOTAL | | | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| 1 | — | 3244 | — | 400 | — | 393 | — | — | 400 | — | — | 0.29 | — |
| 2 | 30 | 3274 | 100 | 500 | — | 389 | — | — | 499 | — | — | 0.35 | — |
| 3 | 25 | 3299 | 100 | 600 | — | 394 | — | — | 599 | — | — | 0.45 | — |
| 4 | 30 | 3329 | 100 | 700 | — | 399 | — | — | 699 | — | — | 0.58 | — |
| 5 | 30 | 3359 | 100 | 800 | — | 405 | — | — | 799 | — | — | 0.80 | — |
| 6 | 35 | 3394 | 100 | 900 | — | 411 | — | — | 900 | — | — | 1.02 | — |
| 7 | 45 | 3439 | 100 | 1000 | — | 415 | — | — | 999 | — | — | 1.26 | — |
| 8 | 50 | 3489 | 100 | 1100 | — | 419 | — | — | 1097 | — | — | 1.47 | — |
| 9 | 50 | 3539 | 100 | 1200 | — | 425 | — | — | 1195 | — | — | 1.78 | — |
| 10 | 65 | 3604 | 100 | 1300 | — | 428 | — | — | 1289 | — | — | 2.02 | — |
| 11 | 85 | 3689 | 100 | 1400 | — | 430 | — | — | 1350 | — | — | 2.13 | — |
| 12 | 95 | 3784 | 100 | 1500 | — | 431 | — | — | 1370 | — | — | 2.16 | — |
| 13 | 100 | 3884 | 100 | 1600 | — | 431 | — | — | 1368 | — | — | 2.16 | — |
| 14 | 100 | 3984 | 100 | 1700 | — | 431 | — | — | 1368 | — | — | 2.16 | — |

NORMAL LAY OPERATIONS BEGIN SEE PIPELAY TENSION SCHEDULE DRAWING

Proven Techniques



Reel Pipelay

- ❖ Complete spoolability analysis including fracture mechanics analysis, ECA, and finite element analysis
- ❖ On-site full-scale bend test facility
- ❖ Destructive test program evaluation of weld and material properties before and after bending
- ❖ High quality RT standards and procedures
- ❖ Use of AUT on mechanized GMAW projects mandated by Global
- ❖ Root repairs on deepwater installation (high strength) disallowed

PLET Installation

- ❖ Design including structural piping, on-bottom stability, thermal stresses, jumper and connector, and installability
- ❖ Single line and dual line PLETs including installation of dissimilar speed dual line connections
- ❖ Installation in excess of 50 PLETs (single line and dual line) in water depths of 750 FSW to 3,000 FSW

Conventional Installation

- ❖ 60-foot joint lengths capability to reduce girth weld requirements
- ❖ Double joining of SCR's offered
- ❖ Mechanized GMAW available as a standard
- ❖ *Hercules* switch from reeled to conventional lay in less than three days
- ❖ Comprehensive installation engineering

SCR Installation

- ❖ Riser design including selection of material and generation of stress histograms acting on the riser for use in damage and fracture mechanics calculations
- ❖ ECA to define acceptable initial critical flaw sizes at various locations through the weld and fracture toughness levels to be achieved through the weld
- ❖ Mechanized GTAW available for extremely tight acceptance criteria
- ❖ Fatigue performance verification of representative girth welds using resonance fatigue testing facilities in collaboration with reputed institutes
- ❖ First or second end SCR installation

Safety

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Experience



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