Throughout the 20th century, the focus of society was on the accumulation of material goods that enriched people’s lives and made daily life easier and more enjoyable. Today, in the first years of the 21st century, there has been a gradual shift away from this mindset towards one that embraces a better quality of life, more concern for the environment and more emphasis on the individual. TOKIMEC is working closely with customers to meet the increasingly challenging requirements of a new century, with products and services that meet the rapidly evolving needs of an increasingly discerning client base.
Marine Systems

Marine systems require advanced navigational and communication capabilities in order to achieve the maximum level of safety and efficiency. The merging of navigation and communications technologies is spurring the development of a whole new generation of marine transportation and physical distribution systems. Increasingly, commercial vessels are computerized and linked electronically with land and sea bases. Invaluable information about shipping route conditions, weather, and land transportation can be readily available to ensure safe and timely delivery of goods around the globe. A leader in this field, TOKIMEC manufactures and markets a wide range of navigational equipment, integrated bridge systems and communications equipment for ocean going vessels.

Utilizing Advanced Navigation and Communications Technologies to Ensure Safer Voyages

Navigation equipment and systems
1. Integrated Bridge System / IBS
A variety of integrated navigational systems and auxiliary equipment makes it possible for ship navigators to monitor bridge functions, allowing them to navigate busy urban waterways with speed and safety.
2. Gyrocompasses
The gyrocompass produces highly accurate azimuth data that is indispensable for determining the course of a vessel. An autopilot maintains a target azimuth based on this information.
3. Autopilots
Autopilot devices automatically steer vessels along predetermined courses and are capable of compensating for wave and tidal action.
4. Electronics Chart Display Systems
This computerized system is capable of producing charts and related data on a screen to assist the crew in confirming a course and to support manual charting. It can also share functions with an autopilot and overlay radar images over electronic charts.
5. Marine Radars
Marine radar is the eye of a marine vessel and is indispensable in determining position, detecting and avoiding other vessels, preventing collisions. The radar system’s display screen warns of vessels in the neighborhood, shorelines, beacons and other physical structures.

Communications equipment and systems
6. Automatic Identification Systems for Vessels (AIS)
This radio system continually transmits a vessel’s data (name, dimensions, type, position, course and speed) and automatically receives similar data from other vessels. The system enhances safety and efficiency and aids in marine traffic control and land support communications.
7. Voyage Data Recorder (VDR)
This system accumulates data on vessel position, movement, control, and other important information together with voice data and radar screen information in a recording unit, much like the “black box” units on aircraft, in order to help investigators ascertain the cause of marine accidents.
8. INMARSAT-F
This system facilitates land-to-vessel communications by means of satellites. The INMARSAT-F (Fleet 77) is a new communications system capable of continuous connections between land and a vessel for web monitoring and Internet mails. This system is being expanded to accommodate strategic utilization of navigational and vessel control data.
9. GMDSS Radio Communications Equipment
This radio communications unit conforms to the internationally recognized Global Maritime Distress and Safety System and is used for emergency relief assistance in marine accidents.
Hydraulic Control Systems

Hydraulic control systems are an invisible yet essential part of the foundation that supports modern society. They provide important functions in the drive and control systems of various types of machinery, such as injection molding machines, machining tools, construction equipment, dam gates and amusement park machinery. In our quest to provide our customers with products that offer the greatest potential for excellent controllability under high pressure, large displacement and low noise conditions, we are also addressing environmental issues important to society. Fluid power is being used in a variety of new power control products such as hydraulically controlled electric drive servo systems and hybrid systems incorporating pneumatic controls.

1. Proportional Electromagnetic Control Valves
TOKIMEC’s proportional valves provide the high level of precision control required in industrial machinery. They offer responsive proportional control with superior repeatability.

2. COMNICA Valves
The new COMNICA valves with onboard microprocessors are solenoid directional valves with flow control capabilities. These valves eliminate the need for intricate control circuits, while providing a high degree of speed and positioning control.

3. Solenoid Operated Directional Control Valves
High pressure and high flow TOKIMEC solenoid valves are offered in a variety configurations, including shockless and mini-watt models.

4. Cartridge Servo Valves
This cartridge servo valve provides control of large flows with high response and low rate of pressure loss in a compact configuration. It is optimum for large flow, high-speed injection control applications, which are beyond the capability of electric systems.

5. Compact Power Packages
Our hydraulic power packages offer practical, space-saving solutions for machine tools and industrial machinery. Their compact design enhances the size, weight and performance efficiency of machine tools.

6. Direct Drive Pump Control Systems
This hybrid hydraulic-drive power source system incorporates a variable displacement piston pump, which is controlled by an AC servo motor. The merits of hydraulic-electric drive are utilized to their fullest potential in this energy-saving, high performance system.

7. High Torque Low Speed Hydraulic Motors
Compact MH7 series vane motors come with many options and provide stable performance in the low speed range which is superior to other types of motors such as radial piston motors.

8. Low Noise High Pressure Variable Displacement Piston Pumps
Low noise, superior controllability, and long life PH series piston pumps offer rated pressures of 28MPa and maximum speed of 1800 rpm (PH170 pressure rating, 21MPa).

9. Low Noise Fixed Displacement Vane Pumps
Single, double, triple SQP (SQPS) series vane pumps are used in many industrial applications such as plastic molding machines and machine tools and feature excellent durability.

10. Industrial Radio Control Systems
TOKIMEC’s technical expertise in hydraulic control has been utilized in the development of radio control systems for hydraulic-powered construction equipment and special purpose vehicles. These systems enable the control of such machinery operating in hazardous environments from safe remote locations.
Supporting the Effective Utilization of Fluid Resources with Highly Advanced Measuring Techniques

1. Ultrasonic Flow Meters/Portable Ultrasonic Flow Meters
TOKIMEC’s ultrasonic flow meters incorporate ultrasonic sensors that can be easily mounted on the outside of existing pipes to provide accurate measurement of flow volumes. Our flow measurement devices have an enviable history of installations in the centralised monitoring systems that govern the flow of water treatment and water distribution networks. Our portable type ultrasonic flow meter is widely used in preventative maintenance work involving the monitoring of flow through pipes.

2. Microwave Level Meters
These microwave level meters provide precise measurement of levels even under severe operating environments including crude oil, LNG, molten metal and chemical liquid storage tanks. We have a full lineup of products for process control suitable for a wide range of applications from petroleum stockpile bases and chemical plants to streams and dams.
Broadening our Scope of Contribution to Society—from Mobile Communications Technology to Sophisticated Security Systems

Data communications
1. Microwave Devices
TOKIMEC offers a comprehensive line of 2-way and 4-way dividers and combiners, directional couplers, antennas and other microwave devices. This line includes wide band, low noise, low power consumption and highly stable amplifiers and VCOs with frequency wavelengths ranging from 200MHz to 18GHz.

2. Microwave Modules
TOKIMEC supplies Microwave modules and subassemblies customized to meet user requirements for advanced digitalization, higher frequency, and denser circuit-mounting applications. We supply a large number of transceiving modules for PHS stations, LAN modules, high-power low-distortion amplifier modules and others.

3. Premises Entry-Exit Control Systems
Contactless IC Card Reader-Writer
To safeguard corporate information, companies are sharply focused on controlled entry into and exit from their office premises, production facilities and research laboratories. TOKIMEC markets various types of security systems, such as its "EXENON" Entry/Exit Control System, for electronic locks and gates, and the "Contactless IC Card Reader-Writer" to configure maximum security card systems.

Communications Control
4. Antenna Directing Systems
The frequent changes in the attitude of a helicopter in engaged in live broadcasting causes misalignment of helicopter relay antennas to the mobile-station and/or base-station antennas, and destabilizes the circuit. TOKIMEC’s antenna directing system integrates microwave technology and inertial sensor technology to maintain relay antenna alignment with the receiving station. The system, installed in helicopters operated by TV broadcasting stations, is an indispensable communications link.

5. Direction-Finding Receiving Systems
Crucial in reporting emergencies via helicopter is quick acquisition of a circuit with the ground staff. TOKIMEC’s direction-finding receiving system fulfills this requirement. The system quickly acquires the video electric waves transmitted from a remote location by the ground staff and displays the direction of arrival on a monitor to ensure timely reporting of fast-breaking news and colorful and sharp images.

6. Gyro Stabilized Camera Systems
Gyro stabilized camera systems incorporate an automatic compensation system that allows for changing attitudes and the vibration of the helicopter. Incorporating an accurate tracing function for images, these cameras are capable of shooting and relaying video footage unimpeded, when combined with an antenna directing system and a direction-finding receiver.

7. Mobile Satellite Communications Antenna Stabilizer
This stabilizer controls the relay antenna of telecasting vehicles with extremely high precision so that the vehicles may transmit radio waves accurately via communications satellite, while in motion. Despite unfavorable conditions of transmission from moving vehicles, relay waves are accurately transmitted to a synchronous satellite orbiting at 36,000 km.

Information and Telecommunications
Telecommunications has changed our world. Cellular phones have made talking with others far away instantaneous and car navigation systems are enhancing driving comfort and even saving lives. Ground digital telecasting services and many other innovations are transforming the way we live.

Microwave technology has been central to the development of mobile communications equipment and our expertise in this area has put TOKIMEC at the forefront of development of wireless IC and microwave devices such as VCOs and SAW filters. We are also developing Gyro Stabilized Camera Systems and antenna directing systems used in advanced interactive television equipment.
An Electronic Eye Maintains the High Resolution of Printing Media.

Printing Inspecting Equipment

Accuracy and precision in labeling is indispensable today in such diverse fields as bar code printing and the labeling of medications. Understandably, should mistakes occur in either of these areas, the results could be catastrophic. TOKIMEC’s highly advanced pattern matching image-processing technique has dramatically improved accuracy in the printing process.

Printing Inspection Equipment

This technology incorporates an advanced image-processing technique known as pattern matching in order to detect irregularities in printing and impurities in printing batches. The process detects problems by comparing data previously stored with current information collected by a CCD camera attached to the printing system. This new equipment is also used in quality control programs for the reproduction of film, non-woven fabrics, aluminum foil and other materials.
Railway Maintenance

Japan’s ultra safe Shinkansen bullet trains travel at maximum velocities exceeding 300 km/hr. and are maintained by the world’s most sophisticated precision maintenance system. Advanced detection systems developed by TOKIMEC RAIL TECHNO INC. continually monitor the condition of the rails and tracks on which the trains ride, measuring rail displacement and wear and even minute flaws in the rail interior. This monitoring system, which incorporates exclusive ultrasonic flaw detecting, image-processing, data-communicating and mechanical control techniques, has made the Shinkansen the most dependable and safest passenger conveyance in the world.

Improving Safety with a Full Support Maintenance Service

1. **Ultrasonic Rail Inspection Car**
The inspection car detects flaws and wear that occur within the rail interior. Ultrasonic pulses are propagated into the rail and return echoes are examined to determine the existence of and type of defects. Laser beams and processing of CCD camera-generated images are also employed to determine cross-sectional rail wear problems that impact riding comfort and noise.

2. **“Data Depot” System**
Our “Data Depot” system is a unique, contact-less system which enables the transfer of information from data stored on discs fixed on cross ties to a vehicular-mounted antenna unit. Among its capabilities, the system provides accurate measurement of distances from starting points.

3. **Ultrasonic Digital Rail Flaw Detector (Rail Tester)**
This pushcart-type rail flaw detector enables detailed inspection of rail sections based on data collected by the ultrasonic rail inspection car. Four-color, cross-sectional images are monitored in real-time and flaw data is recorded on a video recorder.

4. **Portable Ultrasonic Rail Flaw Imager (Sono Checker)**
This versatile imaging-type ultrasonic flaw detector is also used for checking for flaws in rails. This handy device allows the user to select A-scan, waveform, or B-scan, cross-sectional image, and displays.

5. **Expansion Gap Gauge**
A fixed gap, or rail play, between rails functions to compensate for thermal elongation and contraction of the rails. Conventional means of rail play inspection involved manual insertion of a gauge into each gap, a very labor-intensive task. TOKIMEC RAIL TECHNO expansion gap gauge automatically measures and records these gaps, while the unit is pulled along the track by a special motorcar, greatly streamlining this task.

6. **Switch Profile Gauge**
Railway switches, generally referred to as “points”, guide trains along specified rails. Maintenance of complicated point switches requires advanced knowledge and expertise, a process which has been automated with TOKIMEC RAIL TECHNO’s switch profile gauge. When the unit is pushed into position, the device automatically measures the degree of wear and displacement of rails and crossing devices at switching points. Measured results are output in tabular and graphical form and as image displays of the worn rails.

7. **Inspection and Testing Services**
In addition to development and manufacture of railway maintenance equipment, TOKIMEC RAIL TECHNO also provides measurement, survey, testing and maintenance inspection services on a contract basis.
Automating Construction Work to Increase Safety and Productivity

Road construction equipment and systems

1. "Hi-Grade" System
   The "Hi-Grade" system for bulldozers and asphalt finishers utilizes laser beams and ultrasonic distance measurement references to automatically control bulldozer blades and finisher screws to keep the machines on grade. This system is contributing greatly to labor savings, high quality finish work, a significant reduction in project time and safety.

2. Road Surface Cross-Sectional Profile-Measuring Equipment
   This innovative device, developed by combining laser measurement, inertial sensor and software technologies, computes cross-sectional profile (undulation) and inclination of road surfaces in an instant.

3. Road Surface Longitudinal Section Flatness-measuring Equipment
   This equipment measures flatness along road surfaces by use of laser beams. It can cope with sharp curves and significant inclinations, as well as with specially paved surfaces such as for drainage.

Tunnel construction equipment and systems

4. Attitude-sensing Systems for Tunnel Excavation
   This sensing system accurately guides a shield machine that excavates underground along a planned line. It has been adopted in many shield tunneling work sites both in Japan and overseas.

5. Integrated Position and Attitude-measuring Systems for Tunnel Excavation
   This system statistically processes the advancing conditions of shield tunneling machines based on data collected from tunnel excavator attitude-sensing devices and provides real-time graphic displays of any discrepancies along a planned excavation line.

Building construction equipment

6. Floor Level-measurement Device
   This device is used to make precise, continuous measurements of floor flatness in structures at building sites. Flatness is measured by referencing the unit to a horizontal beam from a laser beacon as the unit is moved across the floor.

As a supplier of automated construction equipment to major civil and architectural engineering companies, TOKIMEC CONSTRUCTION SYSTEMS INC. is contributing to increases in safety and productivity on construction sites around the world.

The Company’s "Hi-Grade" system which rationalizes roadbed construction and asphalt-paving and tunnel excavation attitude-sensing systems for shield machines operating in subway construction sites have earned high marks from users in these industries.
Inertial Sensor

Applying inertial sensor technology, TOKIMEC manufactures an accelerometer that is the core of a high-precision seismic meter and a motion sensor for virtual reality systems. We are also developing a wearable micro-inertial sensor which will be put to practical use in the near future in a wide range of new applications.

Accelerating Optimized Control through Sensing Technologies

1. Servo Accelerometer
   This high-precision servo accelerometer is being adopted in a wide range of fields. For example, it is being used in conjunction with a system for seismic data retrieval, which notifies scientists of impending earthquakes based on subtle vibrations recorded from deep within the earth.

2. Motion Sensor
   This device is a compact, lightweight motion-measuring device in which an optical fiber gyro and an accelerometer are combined. One application is its use as a sensor for virtual reality units.

3. Micro-inertial Sensor (MESAG)
   The Micro Electrostatically Suspended Accelerometers and Gyros (MESAG) sensor, under development by TOKIMEC, is a rotary-type multi-output micro-inertial sensor based on advanced micro-machining technology. The technology is being used to develop a wearable micro-device that is expected to revolutionize miniaturized products for consumers.

Disaster Prevention

Since its involvement as the first company in Japan with extinguishing systems utilizing inert (carbon dioxide) gas, TOKIMEC has been active in the development of gas fire extinguishing systems. Our fire extinguishing systems are used in office buildings, museums, multi-story parking structures, printing plants and other important facilities.

Gas-based Fire Extinguishers

Gas-based fire extinguishers are used in a wide range of settings, from large open spaces such as parking garages, to equipments such as printing machines. TOKIMEC produces systems compatible with gas-type fire extinguishing agents, such as a carbon dioxide gas type, which is suitable for unmanned and local areas, a nitrogen gas type that allows hydrogen concentrations safe for firefighters, and a halon 1301 gas type, which prevents suffocation, owing to the negligible release of halon gas during use.

1. Starting Switch Box
2. Starting Cylinder Unit
3. Control Panel
4. Nozzle
5. Gas Agent Discharge Lamp
Defense

Instantly detecting a danger frequency from among multiple scrambled microwave signals and alerting the F15J pilot (TOKIMEC’s radar warning equipment) and safely guiding submerged submarines in a target area (TOKIMEC inertial navigation equipment) require the most reliable of advanced technologies. TOKIMEC is directing such cutting-edge defense technology toward the commercial sector in our ongoing efforts to meet the challenges of tomorrow.

Meeting Advanced Needs with Advanced Technologies

1. Radar Warning Receiver

The radar warning equipment of the F15J detects radar signals reflected from an opposing aircraft and alerts the pilot via a display that shows the opposing aircraft’s direction, distance, type, and other information. Developed by TOKIMEC, the system’s reliability is time proven. TOKIMEC’s microwave technology is also applied to meet diverse needs in the field of data communications.

2. Inertial Navigation Systems

Submarine missions that call for extended submerged cruising are not unusual. In the world beneath the waves, the inertial navigation system is indispensable, because the vessel’s bearing and position checks cannot be performed using astronomical observations, land observations, GPS, and surface-vessel tools. TOKIMEC inertial navigation systems consist primarily of a precision ring-laser gyrocompass and accelerometer, and feature advanced inertial-navigation processing that measures vessel position and speed to an extremely high level of accuracy.

3. Attitude and Heading Reference Systems

TOKIMEC’s attitude and heading reference system for small observation helicopters is a hi-tech system featuring the newest fiber optics gyros. The system measures bearing, position, attitude, and other navigation data relative to the fuselage in order to provide a high degree of safety.
Brief History

1896: Established in Koishikawa, Tokyo as Japan’s first manufacturer of pressure gages and other measuring devises
1901: Began manufacturing compasses, depth sounders and other navigation instruments and equipment
1908: Began manufacturing Sperry gyrocompasses
1923: Began development of aeronautic instruments
1930: Head Office moved to Kamata, Tokyo
1952: Developed Japan’s first marine radar system
1954: Began manufacturing hydraulic equipment
1957: Developed world’s first commercial ultrasonic flow meter
1971: Developed radar warning system used in the F-4EJ fighter plane
1984: Entered the field of factory automation and construction equipment with a product line centered around inertial sensor technology.
1988: Constructed new head office building and R&D Center
1990: Changed corporate name from Tokyo Keiki to TOKIMEC INC.
1996: Celebrated 100th anniversary in operation Established TOKIMEC CONSTRUCTION SYSTEMS INC.
1998: Constructed new head office building and R&D center
1999: Established TOKIMEC KOREA HYDRAULICS CO., LTD., in Korea

Company Outline (as of March 31, 2004)

Company name: TOKIMEC INC.
Representative: Hideaki Katsuki, President
Address: 2-16-46 Minami-Kamata, Ohta-ku, Tokyo 144-8551, Japan
Tel: 81-3-3732-2111
Fax: 81-3-3736-0261
Established: May 1, 1896
Paid-in capital: ¥7,317 million
Stock listing: Tokyo Stock Exchange, First Section
Employees: 1,240

*ISO9001 2000 Certified

Control Division I
Registered Organization: Del Norske Veritas

Electronics Systems Division
Registered Organization: Defense Procurement Structure Improvement Foundation

R&D Center, Factories and Plants

Research & Development Center
3-16-46 Minami-Kamata, Ohta-ku, Tokyo 144-8551, Japan
Tel: 81-3-3739-6995 Fax: 81-3-3731-5263

Nasu Factory
3-1 Takakukou, Nasu-machi, Nasu-gun, Tochigi 325-0001
Tel: 81-287-63-3711 Fax: 81-287-64-2140

Yaita Factory
333-4 Azuma-cho, Yaita, Tochigi 329-2136
Tel: 81-287-43-2121 Fax: 81-287-43-2608

Sano Factory
1-1 Sakae-cho, Sano, Tochigi 327-0816
Tel: 81-283-23-3311 Fax: 81-283-23-0125

Tanuma Plant
108 Tada-cho, Sano, Tochigi 327-0816
Tel: 81-283-23-3311 Fax: 81-283-23-0125

Hamano Plant
2-1-1 Misugidai, Hanno, Saitama 357-0041
Tel: 81-429-71-0550 Fax: 81-429-71-0554

Tokyo Sales Office
2-16-46 Minami-Kamata, Ohta-ku, Tokyo 144-8551
Tel: 81-3-3737-8611 Fax: 81-3-3737-8663

Shizuoka Sales Office
15-10 Wakaba-cho, Numazu, Shizuoka 410-0059
Tel: 81-55-924-4121 Fax: 81-55-924-4314

TOKIMEC Domestic Network

Corporate Data
## Control Division I

- Marine Systems
- Integrated Bridge Systems (IBS)
- Gyrocompasses/magnetic compasses
- Autopilots
- Marine radars
- Navigation information display and information systems
- Engine monitors
- Chart plotters
- Doppler speed logs
- Tracking pilot systems/joystick controllers
- GMDSS Radio communication equipment
- INMARSAT (C,F)
- Automatic identification system (AIS)
- Voyage data recorders (VDR)
- Berthing support systems
- Electro-hydraulic steering systems
- Hydraulic systems for vessels
- Schilling rudders
- Fin stabilizers
- Fire detectors
- Microwave level meters
- Marine BS/CS antenna stabilizers
- Night-vision cameras

## Flow Meters and related systems/equipment
- Ultrasonic flow meters
- Ultrasonic open-channel flow meters
- Ultrasonic fume flow meters
- Ultrasonic fume flow meters
- Microwave level meters
- Ultrasonic level meters

## Fire-extinguishing facilities
- Halon 1301 fire-extinguishing facilities
- Carbon dioxide fire-extinguishing facilities
- Nitrogen fire-extinguishing facilities

## List of Major Products

### Electronics Division

#### Defense systems
- Avionic systems and equipment
- Radar warning receivers
- Tracking systems
- Integrated display systems
- Radar displays
- Gyro-magnetic compasses
- Attitude heading reference systems
- Air data computers
- Accelerometers
- Missile targeting systems
- Radar systems
- Radar indicators
- Map signal generators

#### Naval systems and equipment
- Gyrocompasses
- Inertial navigation systems
- Radar indicators
- Dead reckoning equipment
- Electronic chart display and information systems
- Helicopter landing indicators

#### Ground equipment
- Target sight subsystems
- Slope angle detection systems
- Direction-finding systems
- Laser warning systems
- Position-determining systems
- Hydraulics equipment

#### Other products
- Automatic testing equipment

### Information and communications
- Microwave devices
  - RF modules
  - Antennas
  - Amplifiers
  - Low-noise amplifiers
  - VCOS
  - Filters
  - PLL synthesizers
  - RF/SD systems
  - Data carrier application systems
  - Contactless IC card systems
  - Access control systems
- Communications control systems
  - Antenna positioning control systems
  - Antenna directing systems
  - Direction-finding receivers
- Gyro stabilized camera system

### TOKIMEC Group

#### TOKIMEC AVAIION INC.
- Electronics parts for installation in aircraft
- Noise-resisting wireless intercoms
- EMC prevention equipment
- Sealed rooms
- Sealed boxes
- Signal filters
- Sealed members

#### TOKIMEC POWER SYSTEMS INC.
- Hydraulic and applied systems
- Environment equipment
- Solution-type paper disposers
- Empty can-compressing equipment

#### TECHNIPORT INC.
- Electronics parts
- Video camera systems
- Night-vision cameras
- Infrared cameras
- CCTV/security video cameras

#### TOKIMEC CONSTRUCTION SYSTEMS INC.
- Construction and Civil Engineering Equipment
- Road construction equipment and systems
- Road surface cross-sectional profile-measuring equipment
- Road surface longitudinal section flatness-measuring equipment
- Building blade auto-control system
- Motor grader blade control system
- Asphalt finisher control system
- Asphalt mixture supply sensing system
- Pendulum type sliding resistance-measuring equipment
- Building construction equipment
- Floor level-measuring equipment
- Tunnel construction equipment and systems
- Integrated position and attitude-measuring systems for tunnel excavators
- Level-sensing equipment for tunnel excavators
- Sensors and related systems
- Accelerometers/vibratory rate gysos
- Magnetic azimuth systems
- Servo inclinometers (single/double-shaft)
- Three-dimensional rate measuring sensors
- Inertial measuring instruments

#### TOKIMEC RAIL TECHNO INC.
- Rail maintenance equipment and systems
- Ultrasonic rail inspection cars
- Ultrasonic digital rail flaw detectors
- Portable ultrasonic rail flaw imagers
- Switch profile gauge
- Expansion gap gauge
- “Data Depot” system