SUPERO

OKANO

The Spirit of Manufacturing

岡野バルブ製造株式會社

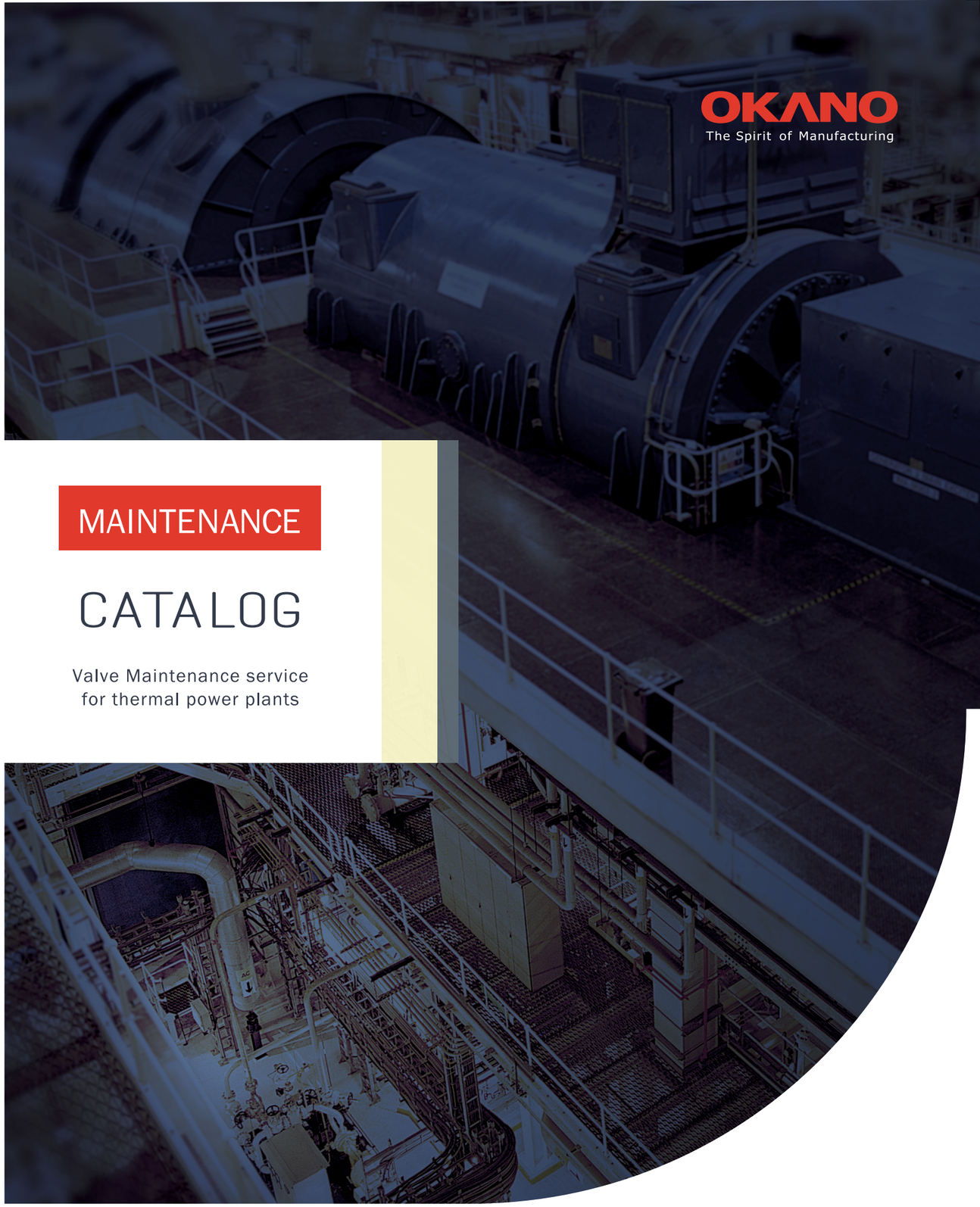
OKANO VALVE MFG. CO. LTD.

http://www.okano-valve.co.jp

This catalog describes the contents as of November 2016. The product appearances and specifications are subject to change without prior notice.

This catalog is the Japanese specification.

② 2016-11-R0



OKANO

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MAINTENANCE

CATALOG

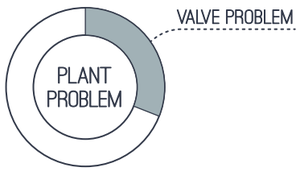
Valve Maintenance service
for thermal power plants

OKANO VALVE MFG. CO. LTD.

IMPORTANCE OF VALVE MAINTENANCE

Unscheduled power plant shutdowns compromise the stability of electric power and damage the social credibility of the power producer, leading to significant potential opportunity loss.

Since extremely large loads are applied to the valves that control high temperature, high pressure steam used in power generation, valve failure is the major cause of the unscheduled power plant shutdowns.



OKANO VALVE MFG. CO. LTD., a world leading manufacturer of high temperature, high pressure valves used in the main steamlines of power plants, draws on a broad store of know-how gathered over the course of a century, integrating this know-how with state of the art technologies to enable sophisticated maintenance operations and efficient, reliable power plant operations.

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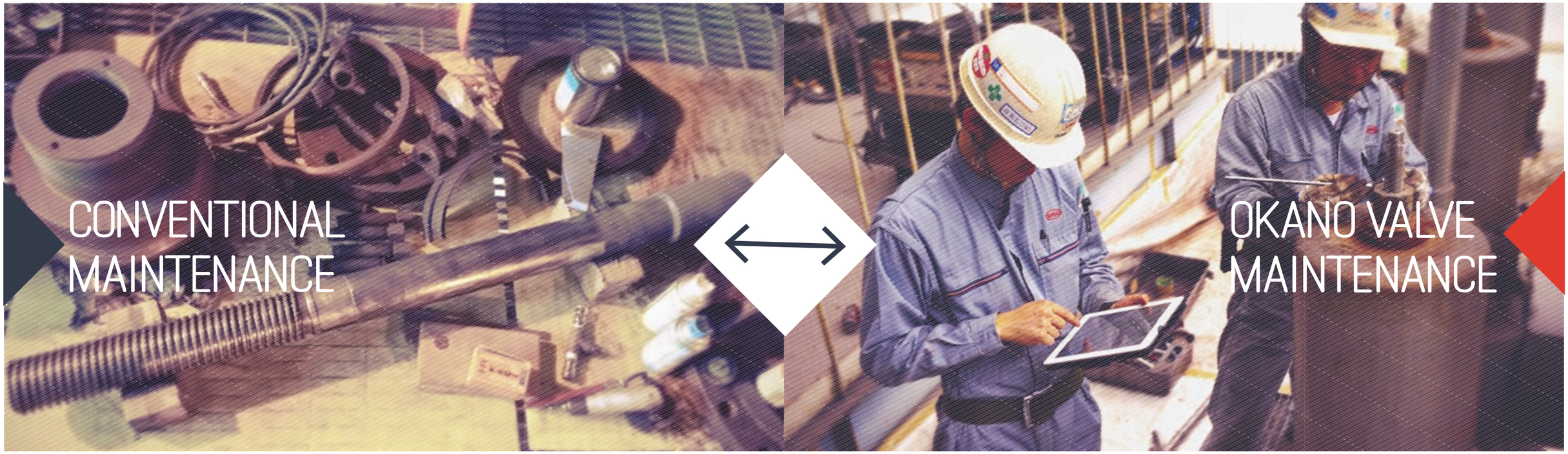


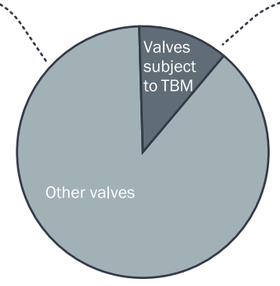
Since valves are pressure vessels, disassembly is the only way to assess the internal integrity of a valve. A single power plant will use several thousands of valves. Given the difficulty of periodically disassembling all these valves, disassembly intervals are determined by the significance and failure history of each valve. Scheduled inspections typically involve the disassembly of some of the valves used at the plant.

OVERHAUL ONLY

RISK

BREAK DOWN MAINTENANCE

Since valves deviating from their Time Based Maintenance (TBM) points more often than not are not subject to disassembly maintenance for an extended period, the valves don't actually receive preventive maintenance. They're almost always at risk of sudden failure.

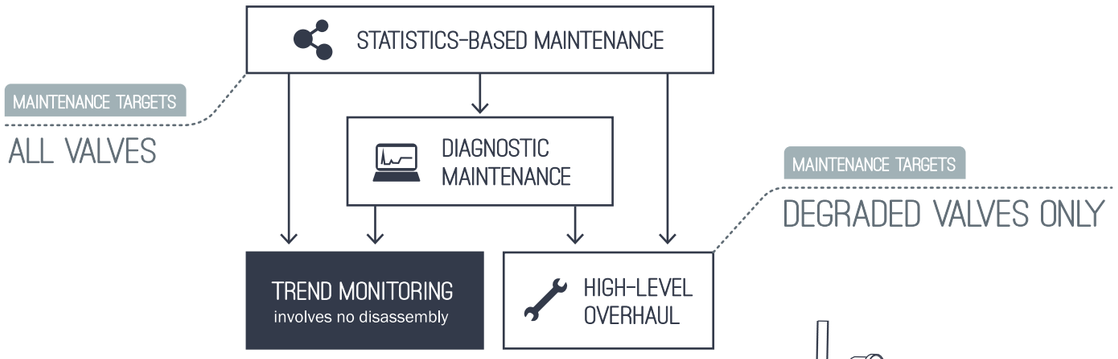


RISK

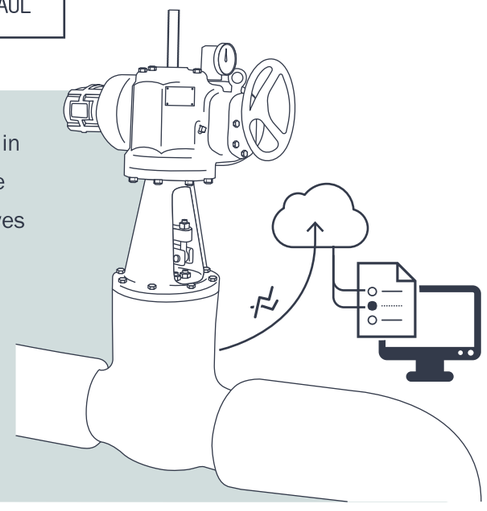
DESTRUCTION

Among its disadvantages, TBM requires disassembling even healthy valves. Valve disassembly by individuals other than specialists increases the risk of destruction, leading to circumstances in which maintenance actually makes valve failure more likely.

COMPREHENSIVE PREVENTIVE MAINTENANCE

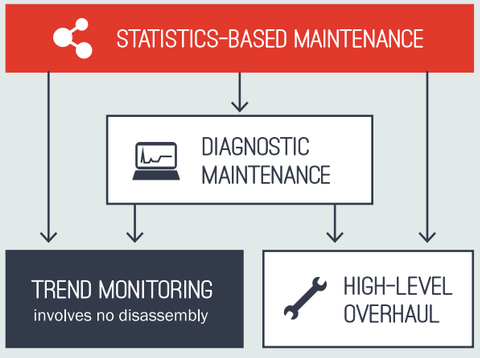


Based on a unique maintenance system incorporating the latest in information, electrical, and mechanical engineering, Okano Valve can perform preventive maintenance for greatest number of valves installed at a power plant, applying a rational and sophisticated approach to maintenance to maximize the cost effectiveness of valve maintenance activities. Okano Valve's comprehensive maintenance system contributes significantly to the stability of power plant operations and to rapid recovery from unscheduled shutdowns.



STATISTICS-BASED MAINTENANCE

MAINTENANCE FLOW

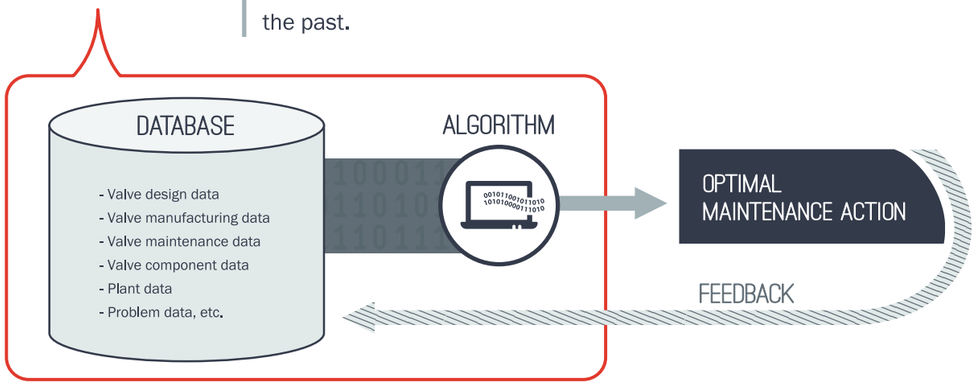


With Okano Valve's maintenance system, all valves are subject to preventive maintenance. Statistics-based maintenance makes it possible to address preventive maintenance for the huge number of valves installed in a power plant.The integration of know-how and data gathered over the course of a century with the latest in information technologies rationalizes maintenance actions without relying on subjective assessments.

INFORMATION TECHNOLOGY

INFORMATION SYSTEM VALVIQUITOUS

Valviquitous is an information system built from a database containing a vast store of valve maintenance information, including design, manufacturing, and maintenance data for targeted valves, and algorithms that semi-automatize judgments based on assessments by engineers in the past.



ADVANTAGE OF VALVIQUITOUS

COMPREHENSIVE APPROACH

The semi-automated analysis system enables preventive maintenance for large numbers of valves. It eliminates the need to pick and choose a limited number of valves for preventive maintenance due to the time and labor posed by conventional integrity checks.

PROFESSIONAL JUDGMENT

Valviquitous provides accurate judgments in complex cases based on know-how and data gathered over the course of a century, making it the most authoritative source of valve maintenance anywhere in the world. The accurate judgments rendered by Valviquitous, which integrate cost effectiveness assessments for engineers, allows optimal maintenance actions.

SOPHISTICATION AND MODERNIZATION OF MANAGEMENT

Valviquitous manages valve information electronically in integrated fashion, free of paper media and complex information management. Accessing Valviquitous makes it fast and easy to obtain the information needed.

INTERNATIONAL ARCHIVES

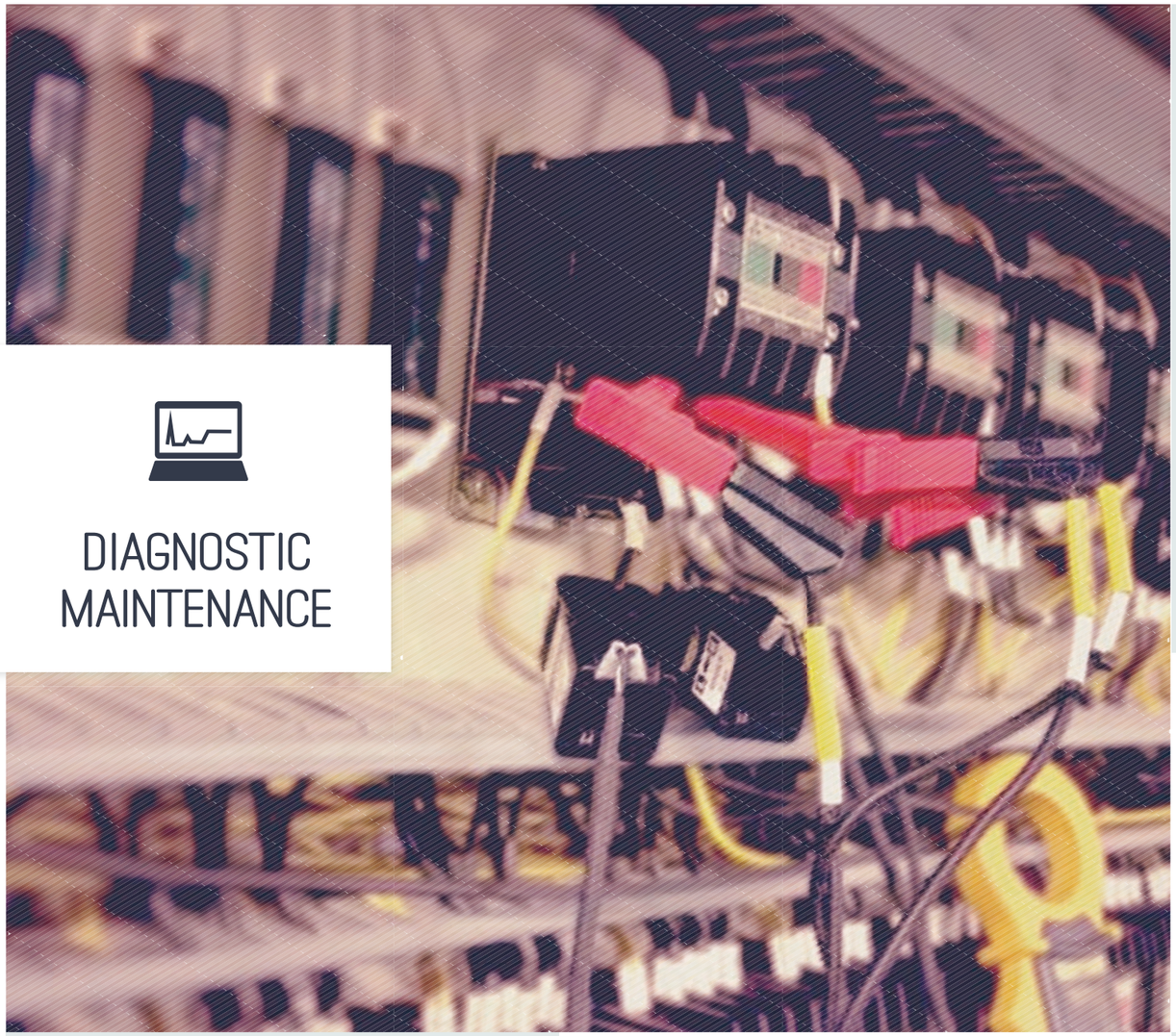
Valviquitous incorporates all the information accumulated by Okano Valve over the past century and constantly adds more information on power plants all around the world, linking the customer's power plant to current and past power plants worldwide.

CUTS MANAGEMENT COSTS

Drawing on the services of a specialist in a particular field-entrusting comprehensive valve maintenance and management operations to Okano Valve-makes it possible to minimize total valve management costs while maximizing the benefits of valve maintenance. The customer can determine the range of activities entrusted to the specialist, based on needs.

CUSTOMIZATION

Valviquitous allows flexible customization of data input methods, accessible data items, output formats, parameter and scope of diagnostic criteria, and so forth.

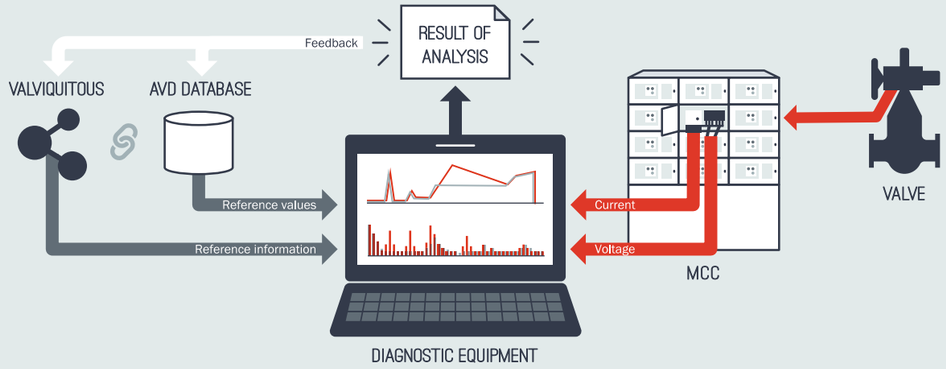


DIAGNOSTIC MAINTENANCE

MOTOR-OPERATED VALVE DIAGNOSIS TECHNOLOGY

AVD AMPERE VOLTAGE DIAGNOSTIC SYSTEMS

AVD technology diagnoses valve integrity by measuring and analyzing current and voltage during the operation of motor-operated valves. AVD does not require valve disassembly, fundamentally altering the nature of valve integrity checks.



15MINUTES DISASSEMBLY-FREE

The only task required by AVD is measuring current and voltage from the MCC. Measurement takes just 15 minutes, achieving dramatic efficiency improvements over disassembly-based integrity checks.

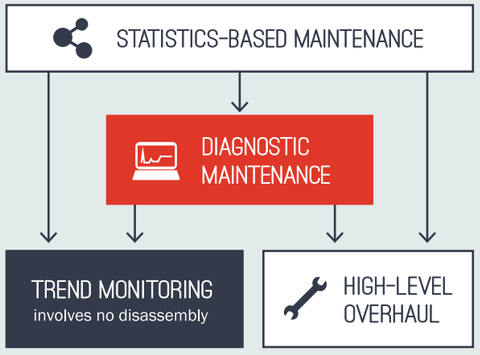
SCIENTIFIC ANALYSIS DEGRADATION TREND MANAGEMENT

The engineering approach permits more rational and more accurate integrity checks than the traditional craftsman approach. Remarkably efficient periodic diagnoses enable degradation trend management and highly accurate failure forecasts, increasing the rationality of preventive maintenance planning.

DIAGNOSIS DURING POWER PLANT OPERATIONS

AVD doesn't require valve disassembly, wiring work, or system isolation and enables assessments of valve integrity during power plant operations. Identifying faulty valves and components doesn't have to involve shutting down the plant.

MAINTENANCE FLOW



Diagnostic maintenance improves the accuracy of maintenance actions derived from statistics-based maintenance and achieves valve integrity meeting or exceeding approaches involving disassembly. Okano Valve's electrical technologies yield efficient, high-performance diagnostic technologies that monitor valve condition without direct physical access to the valves.

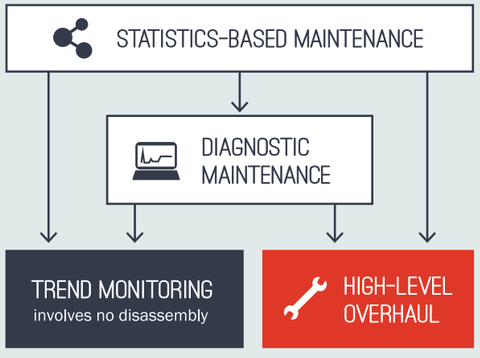
ELECTRICAL TECHNOLOGIES

DETAILED INFORMATION ON AVD

TARGET OF DIAGNOSIS	Motor-operated valves (AC/DC types)	Patents: 4073902 and 4990338.
DIAGNOSTIC FUNCTION	Analysis of waveform pattern	Acquires information on change in behavior during valve operations and checks operating characteristics and faulty components.
	FFT analysis	Analyzes the electrical behavior of valves based on Fast Fourier Transforms during operations to detect problems in rotary components like gears and bearings.
	Analysis of valve capacity	References the design standard to confirm that the target valve is operating under sufficient capacity margins.
	Degradation trend monitoring	Arranges past AVD diagnostic results in chronological order to manage changes in valve condition.
DIAGNOSIS ITEM	- Abnormal operation of torque switch - Abnormal operation of limit switch - Settling of torque spring - Gear wear - Faulty motor - Faulty motor bearing - Vibration during motor operations	- Stem nut wear - Torque generated during valve opening / closing - Degradation of gland packing performance - Faulty valve body - Faulty valve seat - Faulty valve stem - Operating time / valve stem lift, etc.

HIGH-LEVEL OVERHAUL

MAINTENANCE FLOW



Even with advances in disassembly-free valve maintenance, maintenance based on disassembly is inevitable. High-level overhauls involve high-quality disassembly maintenance. Okano Valve's mechanical technologies incorporate know-how and equipment accumulated over the course of a century, backed by the engineers who deploy these technologies to offer secure, optimal power plant valve maintenance.

MECHANICAL TECHNOLOGIES

ADVANTAGES IN INDIVIDUAL OVERHAUL STEPS

STEP 01

The disassembly process is accompanied by numerous risks, including damage to valves and injuries due to dropped tools or components. Okano Valve's highly-trained engineers disassemble valves safely and precisely using special jigs, tools, and techniques optimized for specific installation conditions.

STEP 02

Assessing valve condition takes more than visual inspection. In addition to reviewing the results of statistics-based and diagnostic maintenance, Okano Valve performs integrity checks possible only with disassembled valves, including NDT-based micron level integrity checks. The result is a comprehensive judgement on need for repairs.

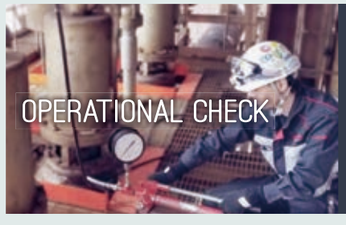
STEP 03

If Okano Valve determines the valve does not need repair, we will service the valve to ensure performance before reassembly. If Okano Valve determines the valve needs repair, we will perform comprehensive studies based on the extent of degradation, cost effectiveness, and other key factors. We will repair valves by the method deemed optimal based on discussions with the customer.

DETAIL

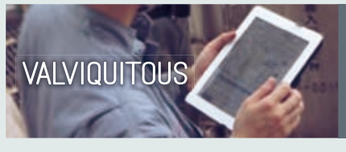
STEP 04

Assembly should go beyond simply returning the profile to its original state. Okano Valve looks for minute changes with age attributable to wear, previous disassembly, service, and repairs and assembles the valve after ensuring precise and comprehensive control of component positions and tightening torques. This ensures the reassembled valve will provide its specified performance and functions.



STEP 05

Finally, Okano Valve operates the valve to confirm it will provide the required performance and functions. Our proprietary operational testing equipment, including safety valve testing hydraulic jacks, maximizes the accuracy and efficiency of this operation check.



All information collected from the overhaul is entered into Valviquitous and reflected in the overhaul report submitted to the customer and in future maintenance.

STEP 03

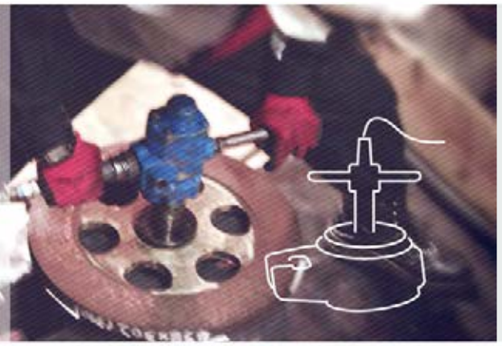
MAINTENANCE / REPAIRS

Okano Valve's maintenance system and wide range of sophisticated techniques ensure valve integrity at maximum cost effectiveness.

SERVICE AND MINOR DAMAGE

COMPONENT SERVICE AND REPAIRS

If Okano Valve determines, based on the disassembled valve, that no repairs are needed, we will service the components to ensure specified performance levels. If we identify the damage to be minor, Okano Valve will restore valve integrity through repairs, rather than by replacing components.



TRUE SERVICE AND REPAIRS

The purpose of service and repairs is to restore function, not visual appeal. Okano Valve's highly-trained engineers service and repair the valve to ensure the specified functions are restored. The fit between valve seats and disk is the most important factor in maintaining fluid seals and can be achieved only by valve specialists. Okano Valve's engineers can make these fittings to tolerances of 1/1,000 mm.

MINIMIZING REPLACEMENT COMPONENTS

Okano Valve's repair technologies increase repair rates of existing valves and minimize the number of replacement components required. In many cases in which general manufacturers might call for replacement, Okano Valve can repair valves to maximize cost effectiveness.

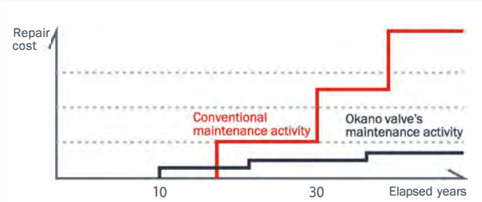
SEVERE DAMAGE OF COMPONENTS OTHER THAN THE VALVE BODY

REPLACING COMPONENTS

In the event of severe damage that can't be addressed by repairs of existing valves, Okano Valve replaces components with new components to restore integrity.

RATIONAL AND EARLY ORDERS OF REPLACEMENT COMPONENTS

Statistics-based and diagnostic maintenance permits rational early orders of replacement components. Okano Valve's maintenance system minimizes the following risks: time-consuming component damage searches during valve disassembly; prolonged restoration due to need for orders of components; requirement to continue operating faulty valves due to unavailability of necessary components; and excessive preparation of needed spares.

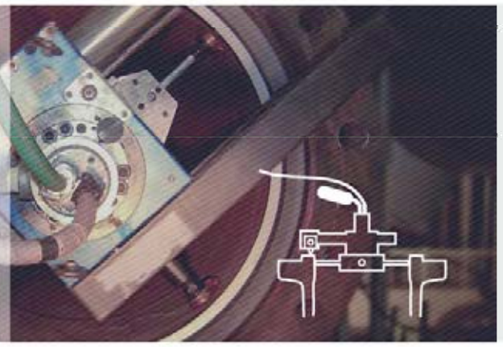


PROJECTED REPAIR COST GRAPH

MODERATE DAMAGE TO THE VALVE BODY

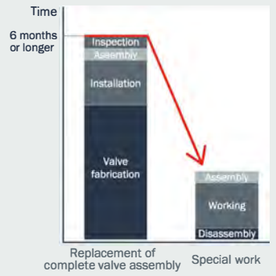
SPECIAL ON-SITE WORK

For valve bodies with moderate damage, Okano Valve will perform special on-site work using special cutting machines and welders to restore valve integrity.

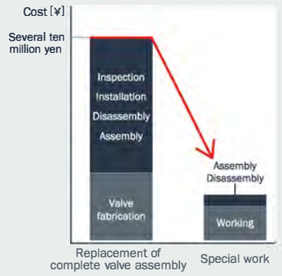


SUBSTANTIAL TIME AND COST REDUCTIONS

Okano Valve's proprietary techniques—not available from general manufacturers—provide an alternative to the replacement of complete valve assemblies in cases in which when damage to the valve body might otherwise call for such action. These special techniques minimize the need for timely and costly replacement of high temperature, high pressure valves welded to piping.



COMPARISON OF WORKING TIME

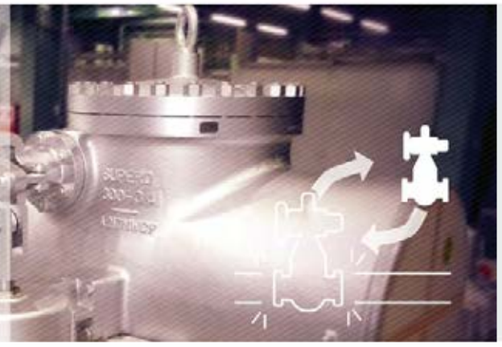


COMPARISON OF WORKING COST

SEVERE DAMAGE TO THE VALVE BODY

REPLACING THE COMPLETE VALVE ASSEMBLY

If any of these methods above is insufficient to restore valve integrity, the last resort is to separate the complete valve assembly from the piping and to replace it with a new assembly.



REPLACEMENT WITH HEALTHY VALVE

As with component replacement, Okano Valve's maintenance system permits rational and early orders of the complete valve assembly. Nevertheless, serious damage to the valve body may be attributable to fundamental problems in piping and valve design. Okano Valve will replace damaged valves with healthy valves, rather than simply preparing the same valve, thereby maximizing the operating efficiency of the plant and maintaining the valve integrity for the longest possible time.

COMPANY PROFILE

OKANO
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NAME OF COMPANY	**OKANO VALVE MFG. CO. LTD.**
HEADQUARTERS	1-14 Nakamachi, Moji-ku, Kitakyushu, Fukuoka, 800-8601, Japan
DATE ESTABLISHED	November 3,1926
CAPITAL	￥1,286,250,000 ($12,487,864 *1$=￥103 € 11,184,782 *1€=￥115)
NUMBER OF EMPLOYEES (Consolidated)	Total 486 (as of end of November 2016)
PRINCIPAL ACTIVITIES	Engineering , consulting , solution , production and fabrication , maintenance and repair of various types of valves mainly for high pressure and high temperature range in the areas of thermal power plants and nuclear power plants, etc.

PRODUCTS

TYPE OF VALVES	MAX GRADE (UP TO THE PRESENT DATE)
WE CAN SUPPLY ALL TYPE OF VALVES THAT YOU REQUIRE. Globe, Angle, Y-globe, Wedge gate, Parallel slide gate, Screw down stop check, Lift check, Swing check, Tilting disc type check, Reverse current swing check(Air or Oil-Opereted), Safety, Relief, Safety-relief, Dual function safety-relief valve, Minimum flow control valve, Electro-magnetic relief valve control valves and 3-Way valves(including motor, Gear, Air, Oil-operated type)	PLANT A-USC thermal power plant PRESSURE ~61 MPa BODY MATERIAL ~9Cr-2W-steel TEMPERATURE ~720℃ VALVE SIZE (DN) ~1200

DELIVERY RECORD

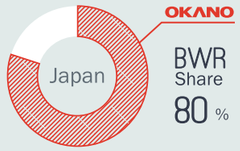
TOTAL DELIVERY RECORD

More than 1,000 plants

More than 1,000,000 valves

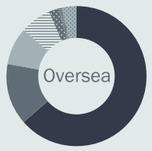
Mainly for nuclear power plant and thermal power plant.
All products are made to order and individually designed.

NUCLEAR POWER PLANT DELIVERY RECORD



BWR Share 80 %

WORLD-WIDE EXPORT



Asia	63%
Middle east asia	14%
Oceania	8.7%
Latin america	7%
North america	2.3%
Africa	0.9%
Europe and others	3.4%

CORPORATE HISTORY