



Zengxin: overturn the traditional thought with redefined 'operation and maintenance'

" 'Maintenance and remanufacture' is certainly not as simple as 'repair and utilize aged or obsolete equipment'," said Mr. Hu Zenghong, Chairman of Shanghai Zengxin Machine Electron Technology Co. Ltd. - Shanghai Zengxin Detection Technology Co.,Ltd. "Actually it means a chance to improve the performance by a deliberate plan conceived on the basis of analysis on the material, structure, design and relevant data obtained by means of monitoring and inspection. After maintenance and remanufacture, the performance of the equipment should be better than ever before. Meanwhile, it should feature significant improvement in terms of efficiency, cost, energy consumption, material, and carbon emission."

By Laura Wang

The pioneer of Industrial 4.0

When you mention "Zengxin", none of domestic and overseas valve manufacturers will feel unfamiliar. Being one of the largest valve testing equipment manufacturers in China, Zengxin enjoys world class design capability, manufacturing experience and relevant patents in the field of valve testing. It also has

in-depth understanding on the structure and process specification of various types of industrial valves. For many years, Zengxin has been actively communicating with leaders of many valve manufacturers, so as to repeatedly try out its test equipment with various types of valve production lines. So far it has developed several types of solutions, such as the

automatic valve testing equipment, valve assembly and testing line, and mobile workshop for valve maintenance and repair. These innovative solutions can help traditional manufacturers to upgrade and transform their business. In recent years, Zengxin has been strategically investing and operating in the automation field. It has been doing



research works, developed multiple types of valve testing equipment, as well as a complete set of valve testing solutions. After detailed investigation, communication, development, experiment, tryout and improvement, Zengxin launched the very first automated solution for valve testing. It was specifically designed to improve the valve testing performance and accuracy of the test results. The involved automatic valve test bench consists of the mechanic system, hydraulic system, electrical system and automatic control system. The automatic control system consists of hardware such as the touch screen man-machine interface, pressure transmitter, swap module, switching power supply, PLC, pneumatic control valve, and the industrial control configuration software. This system can perform the automatic valve clamping and testing – in a fully automatic manner for the whole procedure – from water feeding to pressurizing, pressure maintaining, depressurization and water discharge. During the test, the computer system will automatically identify whether the tested valve is qualified according to a predetermined program and indicate

with specific signals, and then keep the test result in record. So far, this system has been successfully applied at many companies with stable operation performance, and it received sound feedback from users.

In addition to 'automation', the 'assembly and testing line' also belongs to one of the major demands of some valve manufacturers. However, it is widely known that such a 'line' is not suitable for industrial valves because the batch volume is not big enough, the nominal pressure is high, and the nominal diameters are diversified. It's very difficult for any single line to match most types of valve products, not to mention all the types. So the reality for domestic valve companies is to separately run the assembly and testing process. Regarding the contradiction between demand and reality, Zengxin developed a new solution – the assembly and testing line which organically combines both the assembly and testing process. This new solution is uniquely designed according to the assembly and testing process card (process flow sheet), so far it's suitable for butterfly valve products:

- the design, manufacturing, installation, commissioning of the assembly and testing line are all based on the sample product and valve assembly specification provided by valve companies. Supported by quick tooling and chucking change function, the system can be used for assembly and on-line testing of various valve products.
- this assembly and testing line adopts a circular speed chain conveyor system; supports quick
- and automatic conveying, precise positioning, test bench automatic clamping, stacking and automatic return of tooling plate; reduces work piece position changing cycle and the labour intensity of workers.
- the inspection system adopts high precision pressure transducer and PLC analogue input control system; automatically measures and displays the real time measured value; automatically makes assessment according to the pre-set assessment criterion; automatically records the test value in the data base.
- one key configuration for the operating parameters of the assembly and testing line, easy to operate; centralized backstage management; the coded lock effectively prevents manual interference on the testing process and test data.
- multiple error proofing and protection measures at the operation position and testing position, ensures the safety of personnel and product. The detecting



element is adjacent to the testing chamber. This prevents interference from pipeline and hydraulic pressure system and secures the accuracy of the test data. This solution has been applied in some real cases and exhibited sound performance. Meanwhile, Zengxin has been making continuous improvements on the solution according to users' feedback.

'Remanufacture' endorses new definition for 'operation and maintenance'

Besides upgrading the assembly and testing line and improving the smart testing service, Zengxin timely noticed the challenges encountered by users in connection with field operation and maintenance. In response, Zengxin recruited outstanding talents and technicians from various industries in China, utilized the industrial valve maintenance and remanufacture technology and expertise as the pivot point, and established a service platform. This platform mainly handles



maintenance, remanufacture and technical upgrading regarding static equipment represented by valves, and rotating equipment represented by pump, blender and fan. It's capable of satisfying diversified requirements of various clients to the fullest extent. Accordingly, Zengxin established Shanghai Pengxin Detection Technology Co., Ltd.

"The market positioning of Pengxin is exactly the environment-friendly company specialized in fluid equipment maintenance and remanufacture," Mr. Hu revealed. "The traditional maintenance practice is normally conducted according to customary intervals, such as annually or biennially. Such timing is not precise enough. Besides, the proper handling method is very essential. Most of the refinery operators lack such a 'remanufacture' philosophy," Mr. Hu told. "Replaced valves are directly discarded to scrap yards. Such a way of disposal actually causes significant loss of money and waste of resources every year, so we decided to cooperate with outstanding intelligent manufacturing enterprises with the aim to achieve in-depth fusion of intelligent manufacturing and intelligent maintenance," Mr. Hu continued. "The mechanism is to perform on-line monitoring of pipeline as the first step, then make pertinent analysis regarding the specific problems on the basis of real time data about the



New product overview:

Zengxin recently developed and launched the YFB-ZD valve automatic test bench. It's an integrated and fully automatic test bench with multiple functions: valve torque test, life test and factory performance test. It can solve the problem of increased labour cost because one single operator can handle two test benches of this kind. Its test performance is better than that of a manual test. This test bench has obtained the national patent for utility model.

Main types of valve suitable for this test bench include: gate, globe, and ball valves.

Nominal diameter of tested valve: DN50-DN600.

Max. nominal pressure of tested valve: 430 bar

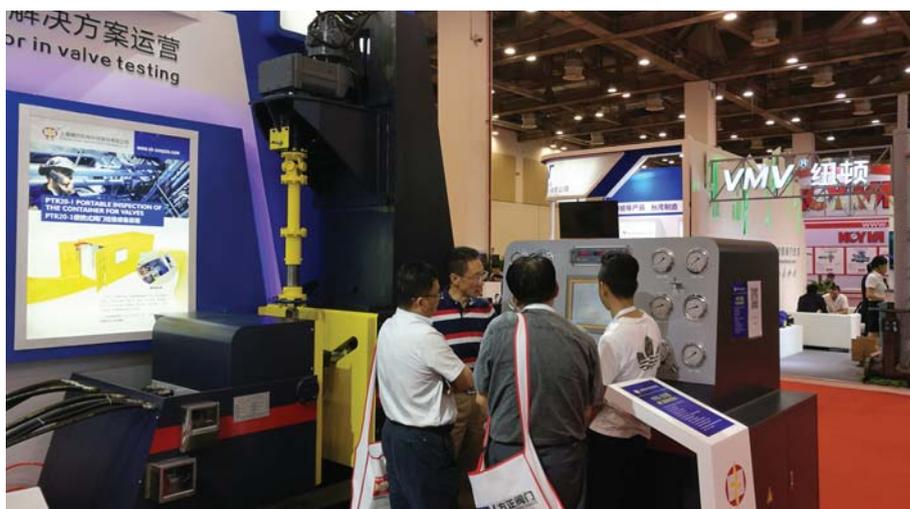
The system reads parameters of the tested valve and the test requirement by means of scanning the bar code on the valve with a scanner; the touch screen interface provides 3 test items for option: torque test, measures the open/close torque of the tested valve; life test, measures the life of the tested valve according to standard; and factory performance test, performs all the factory performance test items in a fully automatic manner. Test results can be automatically collected by infrared leak detecting device and assessed by the system; test results of the three test items can be recorded and retrieved in the form of digits or curves, and can be linked to the plant EMS system and achieve data sharing.

operation condition of the industrial system. The result is more healthy management, operation, maintenance, and effective remote monitoring.”

Regarding maintenance, a variety of mature techniques is available for Zengxin, such as turning, planning, grinding, milling, drilling, welding, hardening, plasma spraying, and laser cladding. Hence, Zengxin is able to provide specific service according to the type of valve as well as the customer’s requirement.

Mobile maintenance workshop:

The ‘Portable valve maintenance container’ is also a flagship product that Zengxin has been offering in recent years. It’s suitable for on-site maintenance and testing regarding gate, globe, ball, safety valve, etc., and especially ideal for valve on-site maintenance in remote place or any place with poor traffic. Mr. Hu explained: “It’s a container type mobile maintenance equipment. In case that any valve in the oil field requires emergency field repair, this equipment is quite handy to perform the job. Overseas countries are also developing such container type equipment but we are more competitive in terms of cost. This is why we received many inquiries last year without any promotion. We believe that the future market will be more promising.”



Replace the ‘aged’ together with owners

Zengxin always keep active interaction in the field of science and technology with authoritative standard committees, design institutes, scientific research institutes and universities. Mr. Hu said: “Regarding intelligent operation and maintenance, what we want to do is definitely not limited to any single aspect. Our goal is to combine the in-service testing, technical renovation and remanufacture of the whole valve/pump system, and carry out a complete and reasonable solution. By such means, we expect to reduce and avoid repeated occurrences of any problem. This will truly benefit the owners and effectively propel the industrial upgrading.”

“However, it’s far from enough if we’re the only party who works on replacing the ‘aged’. We need support from owners with new thoughts. Currently, the international community is changing their thoughts about the ‘aged’ issue into a positive direction. We wish to dedicate our efforts and help more plants to improve their efficiency, performance (mechanical and hydraulic), extend the time interval between maintenance (MTBR), reduce operation and maintenance cost, and benefit the third-party equipment. The replacement of the ‘aged’ actually represents a path for industrial upgrading. We wish to go along with it together with the owners!”

Initial Version

- 500 kg. whip crane with chain blocks
- air conditioner (1.2KW, 1.5P)
- exhaust fan (voltage 220V, air volume 12 m³)
- electrical equipment (industrial illuminant and power outlets)
- general air equipment with quick disconnect coupling
- fire extinguisher
- all necessary equipment used for valve maintenance and repair (hydraulic hold pressure valve test bench, valve clack lapping machine, portable lapping machine for valve seat, drilling & tapping machine, heavy workbench, bench vice, locker etc.)
- O-ring seal and other accessories
- Office furniture

Maintenance services:

Emergency Maintenance	equipped with portable maintenance equipment and emergency repair vehicle; able to arrive the site as soon as possible
Overhaul	complete the valve maintenance and inspection works within the time specified by the client
In-House Maintenance	send to the nearest Pengxin plant; make measurements, prepare spare parts, repair and test
Equipment Improvement	valve or actuator renovation, gas circuit renovation, etc. (remanufacture)
Solution Operation Support	upgrade user’s original configuration or redesign it
Valve Inventory	regularly dispatch technicians to provide on-site routing inspection and maintenance service
Spare Parts Inventory	spot supply or deploy imported or domestic valve products
Spare Parts Inventory	consignment sales or inventory keeping for clients regarding spare parts