Catastrophic failure of machinery or structures is usually expensive to repair and can pose a threat to the health and safety of workers and the public. Remote Visual Inspection (RVI) of materials, components and structures can give inspectors and technicians warnings of many potential failures before they cause problems. A videoscope is an inspection instrument that consists of a miniature camera sensor controlled by a specially engineered insertion tube of various lengths, that permits inspection of internal surfaces and other features of an engine, machinery or structure without causing damage to delicate parts or the need to dismantle.

Olympus—a world-leading manufacturer of optical, electronic and precision engineering products—has been at the forefront of videoscope development for many decades and with the introduction of the IPLEX NX industrial videoscope, the company enters a new era of precision with a unit that leads the way with not only detecting smaller defects compared to existing videoscopes, but measuring these more easily and more accurately than ever before.

“The NX can be used for a broad range of applications and is the new ‘gold standard’ for videoscopes,” said Brendan Slaven, Product Manager – RVI at Olympus. “This latest unit gives you the best of everything.”

RVI is one non-destructive testing (NDT) technique used to evaluate the properties of materials or components without causing damage to, nor permanently altering, the article being inspected. NDT can save both money and time in product evaluation, troubleshooting and research. Olympus has been developing RVI technology for many years and continues to expand its application to a broad range of industry requirements.

An IPLEX NX can help locate flaws that were previously undetectable, as well as streamline inspections in even the most difficult-to-reach areas. The scope combines an industry-leading high-pixel CCD chip, an ultra-bright laser diode light system delivered through the tip of the probe, and Olympus’ unique PulsarPic™ processor to automatically adjust light output, to deliver the clearest images possible in changeable inspection conditions allowing swifter decision-making. Image artefacts, such as false colour, often occur on glossy surfaces, and random noise in low luminance images can be an obstacle for strict inspections. The software's Noise Reduction (NR) algorithm and colour enhancement options have been optimised for use with the NX to minimise distortions and highlight surface issues, such as corrosion.

Stereo measurement features have also been enhanced in the latest model IPLEX. Using a probe with a stereo lens tip, the system can supply 3D space information for specific points in an image.

“We can now achieve accurate measurements over larger areas which increases the types of inspection that can be conducted,” Slaven said. “The new design and other enhancements mean that the NX can accurately measure areas up to four times larger than conventional scopes.”

The design of the IPLEX is such that accurate measurements can also be made from twice as far away as conventional videoscopes. The superior accuracy and image quality of the new NX unit allows inspectors to detect small cracks or defects that were previously measurable only at very close range.

“Larger cracks and defects can be viewed in one single image,” he added. “In the past, it was always possible to get inaccuracies in measurements as multiple images had to be combined to view larger imperfections.”

“In addition, our new ‘multi-spot ranging’ feature provides live 3D surface profile capability,” Slaven added. “It can identify defects more easily by visualising multi point real-time surface shape information during inspections.”

The videoscope camera can be controlled remotely by an operator while it is inserted in the cavity to be inspected. Technicians can easily control the lens assembly using Olympus’ pioneering TrueFeel electric articulation which has been enhanced with reduced mechanical lag and greater sensitivity giving the NX ultra-responsive articulation and an increased range of motion in four directions. Comfortable operation of the lightweight unit and controller minimises user fatigue.

“The NX also includes a large touch screen interface,” Slaven added. “However, you still have the choice between the touch screen or Olympus’s ergonomically designed hand controller to suit the application or inspector preference.” The touch screen is manoeuvrable for optimised ergonomics, OH&S compliance and viewing comfort allowing for more than a dozen configurations and attachment to a variety of tripod or ‘magic arm’ devices.

The NX videoscope can be configured for a variety of inspection tasks, with 6.0 mm probes ranging in length from 3.5 m to 7.5 m and 4.0 mm probes with lengths of 3.5 m and 5 m. The finer probe tip allows access to very confined spaces such as between heat exchanger tubes or turbine blades. The compact and robust construction of the NX design has achieved International Protection Rating of IP55 and complies with stringent US military standards for dust and rain resistance, operation in explosive environments, as well as drop testing.

The insertion tube combines superb manoeuvrability with rigidity and flexibility optimised for smooth scope insertion, enabling target areas to be
reached quickly and easily. Insertion tubes feature four layer construction with a tungsten outer braid for durability and resilience.

The 8.4-inch display screen has an anti-reflective daylight-view monitor, allowing accurate inspections even in direct sunlight. The smaller size makes the IPLEX NX ideal for locations with limited operator access including boilers, aeroplane fuselages and engines, and wind turbine gear boxes.

Post-inspection tasks such as archiving and reporting are simplified as operators can quickly recall and give titles to captured images from the NX display console. Olympus’ optional InHelp data management and reporting software automatically saves images in folders organised by inspection location. Diagnostic information can easily be added to specific images using a couple of button clicks during the inspection, which saves valuable time back in the office. If changes need to be made or results queried, images and video data—including measurements, comments and other annotations—can be edited at any stage on a PC for reporting purposes.

Olympus has been leading the world in the development of Laser Diode illumination technology used in the IPLEX NX. According to Slaven, some of the recent improvements for videoscopes have been in power management from battery and LED technology. These advances have decreased the cost of videoscopes so they are becoming more affordable to more and more markets. “Batteries are smaller and lighter so videoscopes are decreasing in size as well,” he said. “The limitations of original videoscopes were getting light into the area being inspected and the size of the power supply.”

Olympus has also helped its customers adapt or modify instruments to meet specific needs. The IPLEX models provide the latest technology in videoscope instrumentation, in line with the Olympus tradition of producing instruments that continue to be at the forefront of non-destructive testing.

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