# Excellent Precision Before Printing

**USB 2.0 cameras ensure perfect print products**


**“In the beginning was the word”—but there is quite a long way to go from the word to the finished newspaper. After text processing, type matter and artwork, the exact positioning of the printing plate in the printing press is another essential step on this way. This process requires highest precision to ensure that the ink is accurately transferred to the paper. The printing plates are prepared for positioning by so-called register punches and bending machines. The worldwide largest supplier of this type of machinery, NELA Brüder Neumeister GmbH in Lahr, Germany, in future will employ state-of the-art industrial image processing technology with USB 2.0 cameras to process the printing plates economically and fully automatically in accordance with highest quality standards.**

The fully automatic register punches and benders from NELA are machines of the latest generation. Thanks to the consistent use of state-of-the-art production processes and image processing technologies, they satisfy the need for perfect precision. Renowned manufacturers of printing presses, such as Heidelberg, KBA, MAN Roland, AGFA, Kodak or Fuji rely on NELA equipment for completing the printing plates at the end of the production process. NELA machinery is therefore found in the major newspaper publishing houses and job printing companies worldwide. Be it the “New York Times” or the French “Le Monde”, perfect print products call for precision even before the printing process begins.

To ensure that the ink is transferred to the paper true to register, the printing plate needs to be accurately positioned in the vertical and horizontal directions. For this purpose it is prepared, i.e. punched and bent, in the NELA machines—fully automatically! With cameras and positioning units, the printing plates are brought into register-true positions that correspond with their type area. This register positioning requires an accuracy of three hundredths of a millimeter with extremely small bending radii of 0.1 to 0.5 millimeters. Punching and bending is following by a quality check, which again employs industrial image processing technology. The check allows, for example, immediately detecting any deviations in the printing plate images, which may affect the quality of the printing result.

Until recently, positioning and quality control in the register punching and bending machines from NELA were based on an analog camera solution. Increasing requirements for quality and economic efficiency demanded changing to future-proof digital technology. On the one hand, it is easier to handle and reduces system complexity. On the other hand, the higher image quality of this technology achieves a greater accuracy of the measurement results. The digital approach is also more cost-effective.

The best solution soon was found at the Swabian machine vision specialist IDS Imaging Development Systems GmbH. The manufacturer, who had supplied framegrabbers and cameras for the analog equipment of the NELA machinery, has also consistently backed the fast

USB 2.0 interface in industrial image processing for years. Its **uEye**® family thus offers a wide variety of USB 2.0 industrial cameras, matching accessories and accompanying software. In addition, IDS has an in-depth know-how not only regarding integration into custom solutions, but also in the migration from analog to digital. According to NELA's requirements, this migration was to be performed in a quick and time-saving way.

IDS meanwhile offers a range of 24 USB models under the **uEye**® brand name. For positioning the printing plate, NELA uses a camera of the UI-1410-M type (640 x 480 pixels, mono-chrome), as well as a UI-1440-M model (1280 x 1024 pixels, monochrome) for quality control. The **uEye**® cameras have a very compact design, with the smallest version only 24 x 32 x 27.4 mm in size. Special housing variants are additionally available for OEMs and machine manufacturers. The “minis” are equipped with a C-mount lens connection and fastening points on all four sides of the housing.

The product range includes monochrome and color models with up to 3.1 megapixels resolution, models with CMOS or CCD sensors as well as variants with or without memory. The cameras boast fast frame refresh rates of 75 frames per second in full-frame mode and over 100 frames per second in the Area-of-Interest and Partial-Scan modes. Cutting-edge features such as windowing, binning, subsampling and image mirroring in the x and y directions complement the scope of functions.

The most significant advantages are provided by the USB 2.0 connection. It eliminates the need for additional hardware and allows connecting the camera directly to a laptop or PC. The USB port comes in two versions to meet specific requirements: as a standard mini-B type or as a screw-on micro D-sub version for demanding industrial applications! Besides the USB 2.0 port, the latter also includes trigger signal and flash/strobe control.

The register punches and bending machines from NELA use between two and four of these USB 2.0 cameras. The machines automatically recognize the format of the printing plate and select the camera “responsible” for positioning. This camera captures the printing plate coming from the plate processor. In conjunction with a positioning unit, it then brings it into the exact position required for processing.

Since the cameras are very small, easy to transport, and flexible to use thanks to the USB 2.0 port, a simulator was also developed for the register punching and bending machines. The simulator is used primarily in the sales stage. The cameras are connected to a notebook via the USB 2.0 interface to demonstrate the machinery's functionality and software with the customer's own material. The service department at NELA is meanwhile considering additional flexible application possibilities. The service staff is to be provided with camera-equipped templates for adjusting the machinery. The template and notebook are then all that is needed to service the machine on site, immediately and just in time.

By employing the USB cameras, all the requirements of the performance specification could be met, including easier handling, simplified system architecture, lower costs, and higher precision. In addition, migrating from the analog to the digital solution, along with a modernization of the overall software, took only about two weeks in all. Excellent software support played a key part in achieving this very short time.

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