

# PROCEMEX-7X

## Web Monitoring for Printing Presses



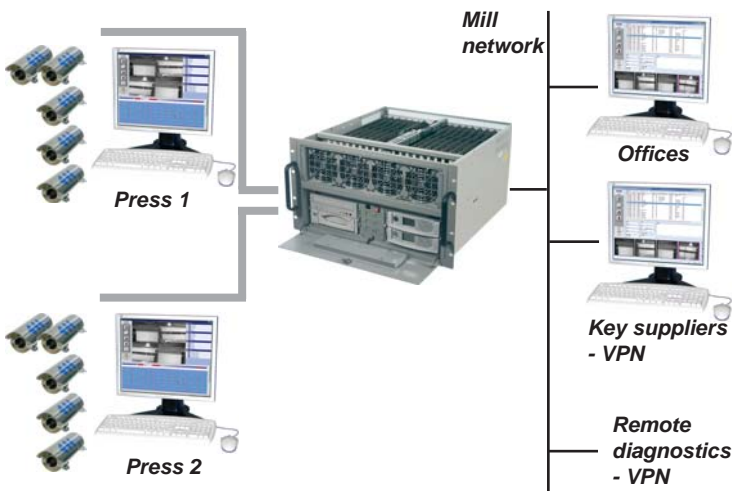
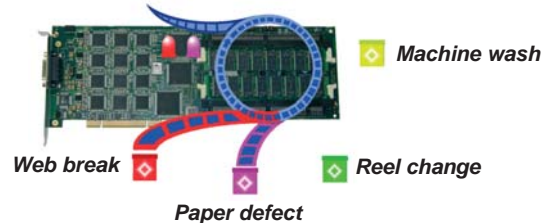
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The global paper industry utilises video camera based web break monitoring systems since 1994. It is rare for any new paper machine to start-up without such technology. Increased demand for higher press efficiency on printing presses has resulted in the utilisation of these systems also.

### PROCEMEX-7X for Printing Presses

Four years ago the most forward leaning gravure and web offset printers began developing, together with Procemex, Web Monitoring technology with the aim of focusing on increasing press runnability and overall efficiency. A corner stone for this development was a user-friendly interface combined with Client/Server architecture across the entire mill network. This would enable printers at the press, production managers and paper purchasers, from their respective work stations to access video based events.

The videos on RAM-memory operate according to the unique SUPER-CIRCLE-MEMORY, and allow simultaneous writing and reading events. This technical innovation ensures that new data is continuously stored on RAM-memory, thus ensuring no loss of any paper defects or web break events.



### PROCEMEX-7X - Developed for Operators

Product development of the PROCEMEX-7X Web Monitoring System has always taken into account the operator of the printing press. The system and its software-based tools are designed to assist the operator solving problems immediately, thus enhancing machine efficiency. The system features different user rights. The printer has access to the relevant press he or she is involved with. The Production Manager and paper purchasers have access to all presses equipped with Procemex technology even if some presses are located at different mill sites.

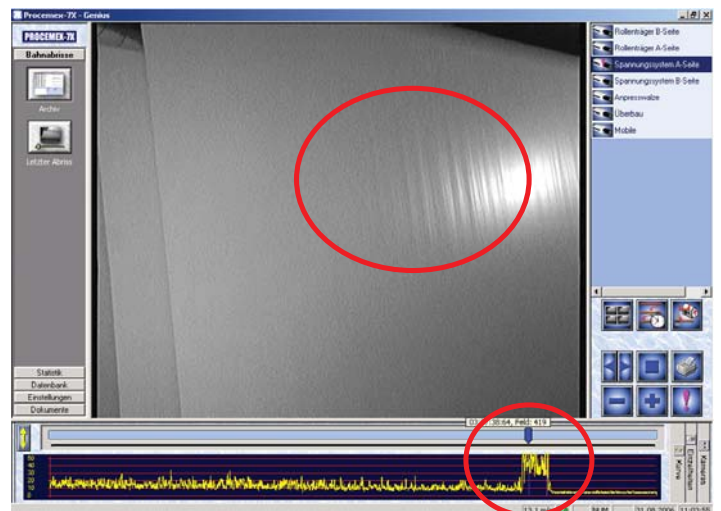
### PROCEMEX-7X Systemlayout and Functionality

Video cameras continuously film the running paper. Some cameras are optimized for solving specific problems and some are standard PAL-cameras, which are all located in camera housings designed for contaminated environments, high temperatures or explosion rated areas. The images are processed by high performance DSP-processors located inside the Procemex Server. Processors perform continuous gray scale analysis, with further image analysis functions and store video data on intermediate RAM-memory chips. RAM-memory always contains the last minutes of video material and video events, which can be processed for different purposes.

For each press disturbance, the system automatically processes videos by transferring image material from RAM-memory onto a set of hard drives. The operator can access the hard drives and see, from each camera position, how the problem visually looked when passing through the press. In addition, videos also cover what occurred before and after the problem.

The system knows the distances between cameras and synchronizes, timewise, different positions thus enabling easy analysis for the operator. For example, a web-break at turner bars can be automatically back-tracked and the root cause can be seen during unwind. The printer at the press confirms the problem analysis, and events are divided into press related, paper related and operator related web-breaks. With machine and user related problems it is possible to take counter measures immediately and prevent repeating web breaks.

When an operator opens a video event, the system automatically takes him or her to the correct position, based on earlier performed gray level analysis. Typically the point for paper breaks are e.g. at turner bars. In order to obtain final confirmation of the root cause of the web break, the operator clicks on the previous camera position (e.g. at unwind), and the system calculates the correct point in the video based on camera distances and machine speed. Through this a web-break and its root cause can be tied together in a reliable way.



Moisture profile problem after tension rolls

## PROCEMEX-7X - Paper Quality Control

Paper purchasers have network access to the data stored in the Procemex database, enabling them to make relative queries on specific events for the respective paper manufacturer. Searched events can be printed or exported to Excel spreadsheets, onto an HTML-page or simply sent with photos by email. It is also possible to periodically produce a DVD for paper suppliers.

Procemex software offers a unique way for light video data transfer and provides a way to communicate with paper mills in real time. Printers can allow paper mills to access the released web-breaks limited to specific events. Paper mills can analyze the root cause of web-breaks without costly travel on-site or waiting for further reports.

## PROCEMEX-7X - Data Synchronizing with External Systems

In addition to the network based access to the system, it is recommended to tie the system in with an existing paper reel data management system, for example, via a ODBC or OPC based software link and/or connect it to the database of the machine manufacturer. In addition to typical paper reel data, e.g. paper manufacturer, reel number, paper grade etc. the system can be linked to other relevant data, e.g. remaining roll diameter or paper draw.

## PROCEMEX-7X - Innovative Image Processing Technology

The name PROCEMEX-7X is derived from the 7 different camera types that can be connected to the system server. Camera types can also be later changed as the electronics boards are equipped with software drivers for each camera type.

Analog cameras:

- PAL/NTSC black & white camera (half image)
- PAL/NTSC color camera (half image)
- Progressive Scan camera (full image)
- Line-to-Matrix camera
- Infra Red camera

Digital cameras:

- Procemex-Flex 1.3 million pixel camera
- Folder Camera



0.2MP      0.5MP      1.0MP      1.3MP

- PAL b&w	██████████			
- NTSC b&w	██████████			
- PAL COLOR	██████████			
- NTSC color	██████████			
- Progressive scan	██████████	██████████		
- Standard VGA digi cam	██████████	██████████		
- Procemex Flex 1.3 MP	██████████	██████████	██████████	██████████

Resolution comparison of different Matrix Cameras



Left - Procemex Flex camera with 1280 x 1024 resolution  
Right - image of paper defect

## PROCEMEX FLEX - State of the Art Camera Technology

Procemex has developed special 100% digital intelligent camera technology for filming the most demanding press positions. This camera can be used, e.g. for achieving higher accuracy for paper defects or for filming folders continuously.

Procemex Flex camera offers:

- TCP/IP based fully digital communication
- Leading edge resolution with 1.3 million pixel
- Up to 500 images per second
- 130 MHz data processing
- DSP-based image processing & analysing inside the camera
- Super Circle-RAM-memory inside the camera
- On-line defect classification inside the camera
- Visualization in grayscale or in color
- Image frequency can be synchronized with line speed (e.g. with rotating process parts creating a stroboscope effect)

## PROCEMEX-7X - Improving Press Efficiency

Based on the experience gained from over 50 Procemex-7X installations on printing presses, it is clearly necessary to focus on operators, paper and press performance to achieve higher overall press efficiency. Improving only one of these areas will not lead to achieving desired results.

