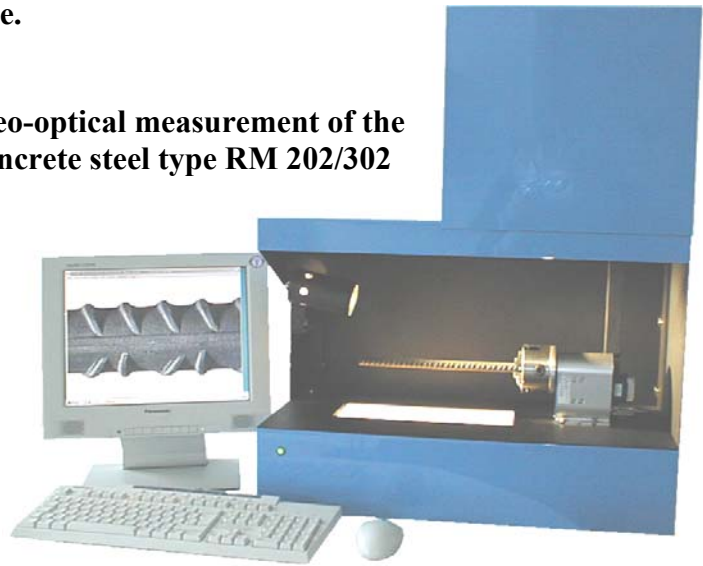


Modernizing of the inspection equipment

1. Rebuilding of your tensile testing machine: electronic measurement of Force and distance.

2. System for video-optical measurement of the geometry of concrete steel type RM 202/302

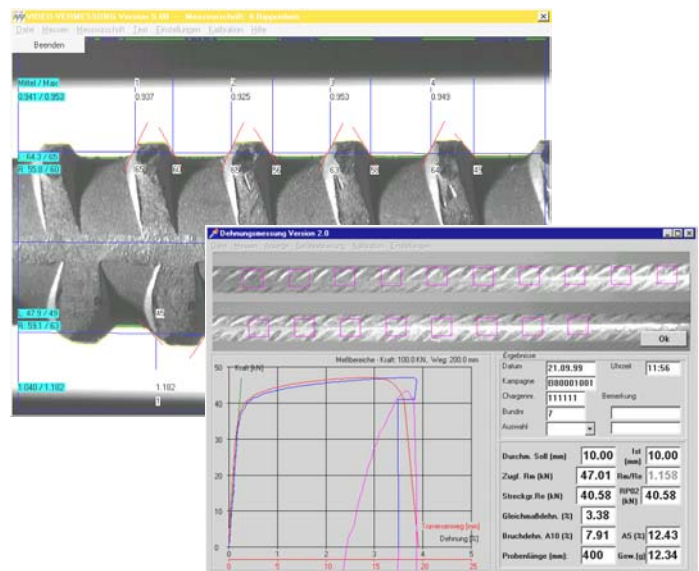
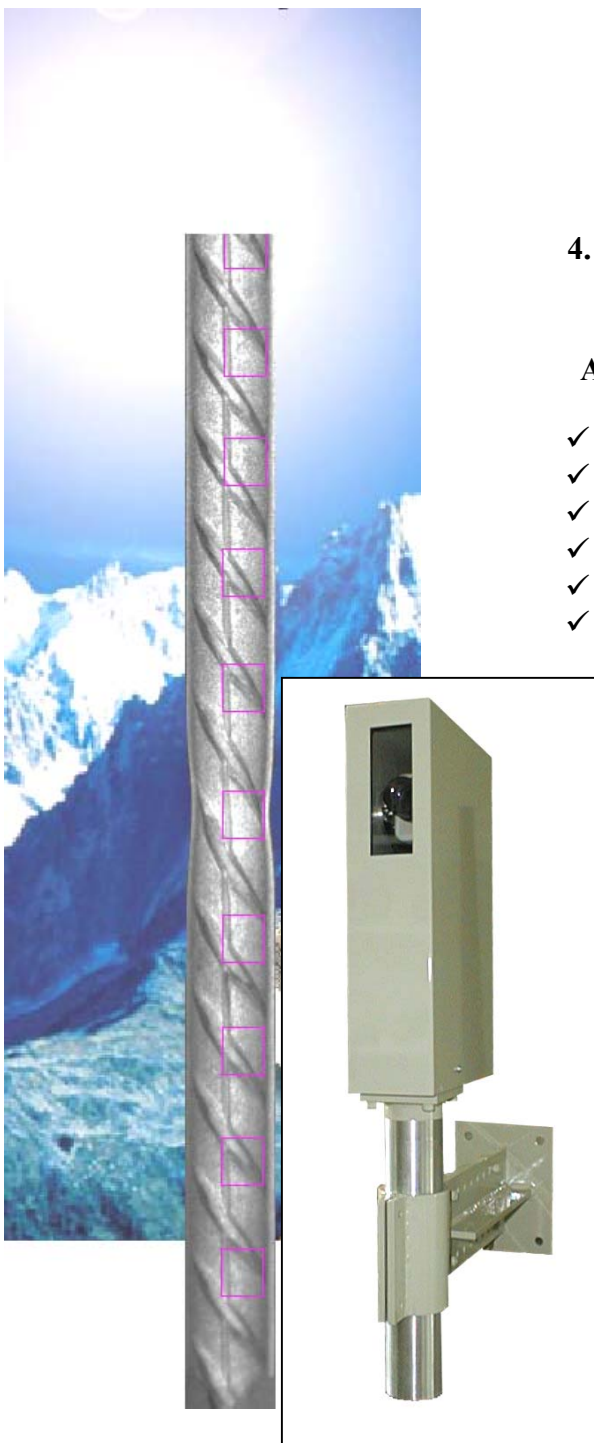
3. Video-Extensometer for automatic measurement of yield strength and elongation type DHM 301/302



4. Common data processing program for handling and printing the measurement results

Automatic measurement of:

- ✓ Tensile strength R_m
- ✓ Yield strength R_{eH}
- ✓ Yield strength $R_{p0.2}$
- ✓ E-module
- ✓ Stress ratio R_m/R_e
- ✓ Stress ratio $R_m/R_{p0.2}$
- ✓ Total elongation at max. A_{gt}
- ✓ Elongation at fracture A_{10}
- ✓ Elongation at fracture A_5
- ✓ Concrete steel: projected rib area f_R
- ✓ Mass per kg.
- ✓ Cross sectional area



Handling everything from data entry up to storage, protocol output and statistical evaluations completely in one system...

Taking probes

Test progress

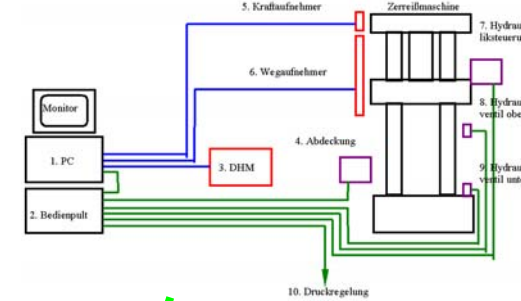
Weighing



Geometrical measurement



Tear test



Evaluation and documents

ECM GmbH
Test-Üml., Test-Gir. 1, 12345 Test-Üml.

Prüfergebnisse BST 500 S

Chargennummer: 123433 22.06.4
 Problemnr.:
 Werk-Nr.:
 Hersteller:

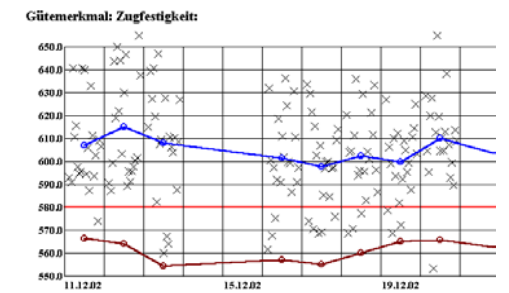
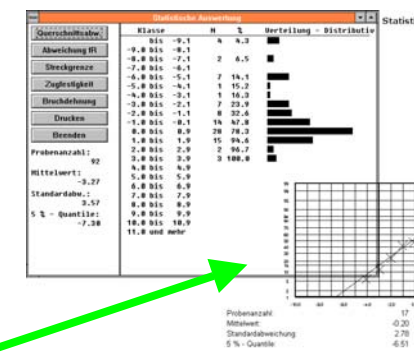
Reihe	Abm. (mm)	MSt (mm)	Rippenhöhe (mm)	Verfahrspunkt (mm)	Rippen-Abstand (mm)	Winkel (°)	Beta (°)	Reihen-Abst. s (mm)	Kopf-Breite (mm)	bezogene Rippenf.
1	0.0	0.00	0.00	0.00	2.4	47	39	1.0	0.74	0.105
2	0.0	0.00	0.00	0.00	2.4	49	33	1.0	0.83	
Mittelw.	0.00	0.00	0.00	0.00	2.4	48	31	1.0	0.78	+287.4 %

Chargennummer: 12333 17.07.4
 Problemnr.:
 Werk-Nr.:
 Hersteller:

Advantages by detail:

- No need of marking the probes
- Measurement according to several european and international standards
- Automatic steering of the tear machine (optional)
- Collection of all results in one database
- statistical Evaluations are integrated
- creating of controlling cards for the process control
- Repeatability of measurement results are insured
- The output can be formed in any manner
- Fast and precise measurement of the geometrical structure
- Measurement accuracy about 0.002 mm

Data flow



System description RM 202/302

The concrete steel rod to be tested (length: approximately 200 mm) is clamped horizontally in the measurement unit, which is mounted on a work bench; it is illuminated at high contrast by means of rotation, using vertical lighting or back lighting depending on the measured variable. The test piece is optically recorded at high resolution by two or three black and white CCD cameras from various angles, and is presented in a window on the computer monitor. The measurement principle is based on a search for black-to-white transitions, and the object boundaries are determined from the gray stages using a gradient process.

The device is calibrated with the use of tested round rods, which have incisions at precisely defined intervals. Calibration takes place automatically and can be repeated at any given time

Messergebnisse

Ergebnisse Speichern unter:

Datum / Zeit: 03.07.99 14:33

Sollabmessung: 11,0

Materialtyp: S: Stabmaterial

Chargennummer: 4711

Material: Coils

Rinne:

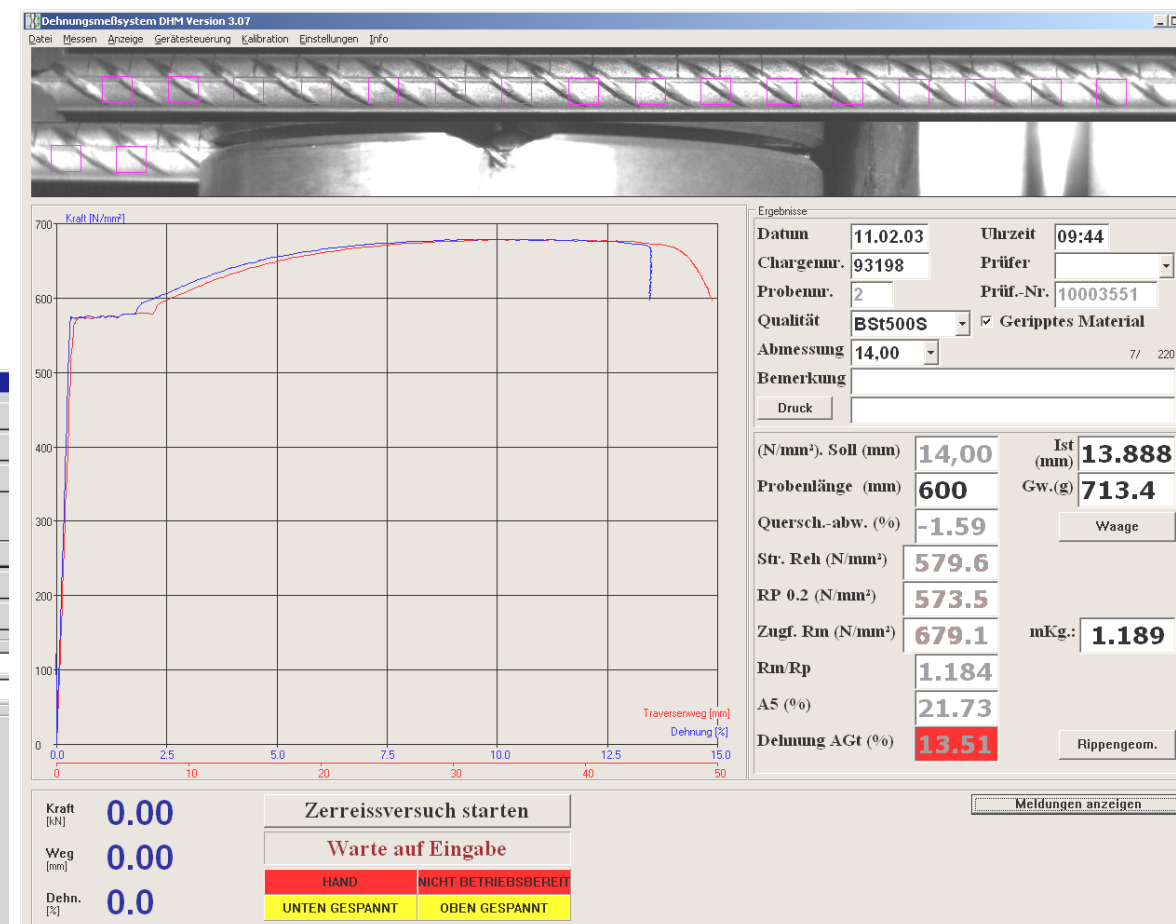
Schicht:

Ist-Durchmesser: 10.57 Abw. Q (%) 7.7

bezogene Rippenfläche: 0.058 Abw. IR (%) +3.6

Bemerkungen:

Messergebnisse	Reihe	1	2	3	4	5	6
Rippenhöhe Mitte		0.71	0.76	0.77			
Rippenhöhe 1/4 Pkt		0.49	0.64	0.55			
Rippenhöhe 3/4 Pkt		0.58	0.62	0.52			
Rippenabstand		7.7	7.7	7.6			
Reihenabstand e		1.2	1.8	1.1			
Kopfbreite		2.59	2.36	2.72			
Rippenneigung (beta)		44	51	46			
Rippenn. (beta) altern.							
Rippenflanke (alpha)		19	17	16			



System description

The object to be tested is clamped in the testing machine for tensile and strain measurement. During tests 1 to 2 CMOS fast, black-and-white, high-resolution cameras take pictures of the test and displays them in a window on the computer monitor. The computer follows the test by specimen comparison of points on a test bar that were previously set either automatically (tensile testing of concrete reinforcing steel) or manually (general displacement measurements) and then records the absolute or relative position changes of these points.

To plot the requisite measuring curves, the force and traversed path data of the testing machine are read into a serial input, or the analog digital inputs of a test value recording card in the PC, while the optical elongation values are being simultaneously displayed.

Modernizing of hydraulic tearing machines

For the electronic data acquisition at the tearing machine the following parts will be installed:

1. Hardware installation:

1. Distance sensor (NovoTechnik)
2. Hydraulic force measurement system (Hottinger)
3. Optical extensometer (ECM)
4. PC with Keyboard and Monitor
5. Analogue/Digital-Card for capturing the output signals of the distance and force sensors (Kolter Electronic)
6. Frame grabber card for capturing the Image signals from the Extensometer (Epix Inc.)
7. Optional: Interface card for reading of the weight from the balance.
8. Optional: Controlling console and hydraulic valves for fully automatic Measurement with controlling by PC.

2. Extensometer:

The Extensometer is a touchless optical measurement system for round steel probes. One or two cameras will be installed fixed in a distance of about 60 to 80 cm to the probe in a protection case. The cameras take continuously pictures of the test and displays them in a window at the computer monitor.

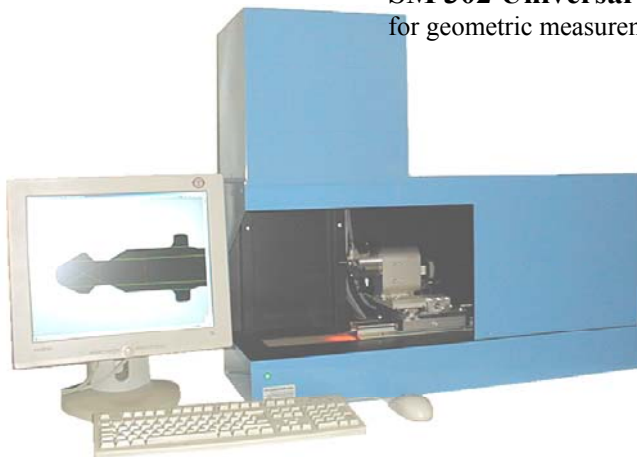
3. Software:

With the software of the systems the images captured from the cameras will be

Further products of the **ECM DATENSYSTEME GMBH**

SM 302 Universal Measuring System

for geometric measurement of screws, plug connectors and other small objects.



- Accuracy up to 1/1000th mm
- Automatic measuring process freely definable with Meta language
- Integrated data bank with far-reaching search and statistics functions
- Counter-checking against setpoints
- Output in freely definable test protocols
- Visual control of the measuring process
- Automatic calibration functions
- Calibration protocols by measuring certified specimens
- Individual measuring steps can be verified

ZM 202/203

Optical complete automatic measurement of thread stones

Measurement of

- Diameter
- Cone angle
- Cylinder height
- Shape

Meas. scope : 0.01 to 20 mm Ø



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