<table>
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<td><strong>Author(s)</strong></td>
<td>Fuchs, Boris.</td>
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Reel Stands & Tension Control

By

Boris Fuchs
IFRA/AMIC - Workshop Web Offset Technology
in Bangkok, Thailand, 8 - 9 September, 1994

Reel Stands & Tension Control

Boris Fuchs, IFRA
Fig. 12.1-12.4: Automatic reel splicing sequence — with stationary belts

12.1 Position: Positioning the new reel when the expiring reel reaches a pre-determined diameter.

12.2 Pre-drive: The pre-drive arrangement speeding the new reel to the surface speed of the expiring reel.

12.3 Splice: Pasting to the new reel and severing the expiring web.

12.4 Transition Tension: Transition tension control ensures accurate and constant web tension by electronic means throughout the reel change cycle.
A look inside the DLC MEG reelstand: 1 = Four-quadrant motor; 2 = expanding chucks; 3 = two- or three-arm rotation shaft; 4 = pivoting splicing assembly; 5 = dancer assembly; 6 = emergency brakes.
UNIPASTER 1270 FR
Einziehvorrührung
Webbing-up device

Zugwerk
Infeed unit

Drehrichtung der Rolle
turning direction of
the reel

Drehrichtung der Arme
zum Kleben
turning direction of the
arms when pasting

Beladung
loading

CD-Paster (in Klebestellung für große Rolle)
(in pasting position for big reels)

MAN ROLAND
Einziehvorrichtung
Webbing - up device

Zugwerk
Infeed unit

AUROload für CD-Paster
Rollenwechselsteuerung

Rechner

CPU (Zentralleinheit)

Speicher

(PROM, RAM)

Daten- und Adreßbus

Netzgerät und Batterie

Gurt-antilieb

Regelung der Gurtantriebe

Zahleneingänge für Geschwindigkeit und Umlauf

Digitale Eingänge

Einrichtung

Gurtpendel

Schnitwerk

Drehung

Anwahl

Freigabe

Netzgerät und Batterie

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Einziehvorrähtung
Webbing-up device
Einziehvorräichtung  Kettensystem  
Webbing-up device  chain system
Einziehvorrichtung  Weiche
Webbing-up device  point
Einziehvorrichtung  Einhängesystem
Webbing-up device  hook-up system
FMC Can Supply Everything
For Your Paper Handling Needs
● = Bahnspannungsmessung
  mesure of web tension

**TECOSYS** (Tension control system)
Vorspannwerk mit Pendelwalze
Debiteur avec rouleau pendulaire
Infeed unit with dancer roller

Zugwalze
Rouleau de traction
Driven roller

Gummirollen
Galets de caoutchouc
Trolleys

Pendelwalze
«Ist-Wert»
«valeur réelle»
du rouleau pendulaire
«actual value»
dancer roller
Vorspannwerk mit Messwalze
Débiteur avec rouleau de mesure
Infeed unit with measuring roller

Messwalze
Rouleau de mesure
Measuring roller

Zugwalze
Rouleau de traction
Driven roller

Gummirollen
Galets de caoutchouc
Trolleys

Zug-Sollwert
Valeur de consigne de traction
Nominal value-drive
Zugwalze mit Harmonic Drive
Rouleau de traction avec Harmonic Drive
Driven roller with Harmonic Drive

Zugwalze
Rouleau de traction
Driven roller

Rouleau de mesure
Measuring roller

Messwalze
Gummirollen
Galets de caoutchouc
Trolleys

Längswelle
Arbre longitudina
Main drive shaft

Anzeige
Zug «Ist-Wert»
Affichage de la «valeur réelle»
de traction
Display tension «actual value»

Sollwert Voreilung
Valeur de consigne
de l'avance
Nominal value-advance
Zugwalze als elektronische Welle
Rouleau de traction sous forme
der arbre électronique
Driven roller as electronical shaft

Zugwalze
Rouleau de traction
Driven roller

Gummirollen
Galets de caoutchouc
Trolleys

Anzeige
Zug «Ist-Wert»

Affichage de la «valeur réelle» de traction

Display tension «actual value»

Sollwert Voreilung
Valeur de consigne du rouleau pendulaire
Nominal value-gain
4.1. Core properties for a reel up to 1.7 m in width

1. Inner diameter: 76.2 + 0.4 mm; −0.0 mm.

2. Outer diameter: maximum 107 mm (to enable fixed splicing).

3. Weight: ≤4 kg/m (to avoid heavy waste).

4. Moisture content: 6 ... 9 percent.

5. Crush strength (compression strength): >2000 N/100 mm (other strength properties also important, though less common in practice due to lack of standard measuring methods).

6. Elasticity modulus: >2700 N/mm². Not critical at normal web widths (1.6 m), but becomes critical at web widths of 2.5 m.

7. Linearity (warpage): ≤2 mm/m.

8. Out-of-roundness: maximum 0.5 mm.

9. Deformation on core: Acceptable on inner diameter to a certain extent without major fibre damage, not on outer diameter. The reel must be demountable and replaceable.

10. Before the reuse of a reel, core damage must be evaluated.

11. Information to be listed inside core: manufacturer, type of core, identification code.
4.2. Chuck properties

**Expanding chucks**

1. Nominal diameter: preferable 75 mm.
2. Expansion movement: high, preferably 82 \ldots 85 \text{ mm} in diameter.
3. Contact surface: 5000 mm$^2$, central drive; 2000 mm$^2$, belt drive.

**Conical chucks**

1. Contact surface: Long type of chucks recommended.
Expanding chuck of reel stand Goss CT-45 (T1).

Short conical chuck of Goss old type reel stand (T2).

Long conical chuck of reel stand MAN Flypaster 1150 (SK).

Expanding chuck of reel stand KBA RE 2 (KA).
Unwind unit

Infeed unit

Print unit 1

IGR for check measurement

PZ top

DZ top

DZ bottom

PZ bottom extended

Web tension control (prepared)

Web tension control (prepared)

Folder

Supply individual drive

Simatic S5 - 135 U

PZ = plate cylinder
DZ = impression cylinder
FU = frequency converter
IGR = incremental measuring system
PG = programming device

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Zugwalzen

Wendestangen
Etagen

Falz-Ueberbau

elektronische Welle

Zugwalzen
Reports from each reel stand

Scanning of barcode and inspection of damages

Connection for data to PC

Laser scanner for scanning reel stand reports

Connection to hand terminal to dump data into PC

Reports to production office

Reports to storage reel stand

To press room

To storage

Off-loading
For tests S 1.1.1 to S 3.3:
DW 1: impression on, colour: magenta, damping as in table
DW 2: impression off, with dummy plates, damping off
DW 3: impression on, colour: black, damping normal
DW 4: impression off, with dummy plates, damping as in table

For tests S 4.1 to S 4.3:
DW 1: impression on, colour: magenta, damping as in table
DW 2: impression on, cyan, damping normal
DW 3: impression off, with dummy plates, damping off
DW 4: impression off, with dummy plates, damping as in table

Damping: Normal: damping under production conditions
N + 20%: 20% more damping agent than normal
N + 50%: 50% more damping agent than normal
--- switched off

Printing speed: 50,000 copies/h correspond to a web speed of 7 m/sec.

Figure 9: Rel. stretching recorded during tests carried out with the satellite unit configuration of the "Abendzeitung" press.
Relative stretch [%]

Test conditions blanket-to-blanket printing

<table>
<thead>
<tr>
<th>Test no.</th>
<th>Print speed copies/h</th>
<th>Web tension [dN/m] infeed</th>
<th>Web tension [dN/m] delivery</th>
<th>Damping DW 1</th>
<th>Damping DW 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 4.3</td>
<td>50 000</td>
<td>34</td>
<td>14</td>
<td>normal</td>
<td>N + 50%</td>
</tr>
<tr>
<td>G 4.2</td>
<td>50 000</td>
<td>34</td>
<td>14</td>
<td>normal</td>
<td>N + 20%</td>
</tr>
<tr>
<td>G 4.1</td>
<td>50 000</td>
<td>36</td>
<td>18</td>
<td>normal</td>
<td>normal</td>
</tr>
<tr>
<td>G 3.3</td>
<td>50 000</td>
<td>16</td>
<td>10</td>
<td>N + 50%</td>
<td>normal</td>
</tr>
<tr>
<td>G 3.2</td>
<td>50 000</td>
<td>16</td>
<td>10</td>
<td>N + 20%</td>
<td>normal</td>
</tr>
<tr>
<td>G 3.1</td>
<td>50 000</td>
<td>16</td>
<td>10</td>
<td>normal</td>
<td>normal</td>
</tr>
<tr>
<td>G 2.3</td>
<td>50 000</td>
<td>78</td>
<td>50</td>
<td>N + 50%</td>
<td>normal</td>
</tr>
<tr>
<td>G 2.2</td>
<td>50 000</td>
<td>82</td>
<td>52</td>
<td>N + 20%</td>
<td>normal</td>
</tr>
<tr>
<td>G 2.1</td>
<td>50 000</td>
<td>82</td>
<td>52</td>
<td>normal</td>
<td>normal</td>
</tr>
<tr>
<td>G 1.3</td>
<td>50 000</td>
<td>32</td>
<td>16</td>
<td>N + 50%</td>
<td>normal</td>
</tr>
<tr>
<td>G 1.2</td>
<td>50 000</td>
<td>34</td>
<td>16</td>
<td>N + 20%</td>
<td>normal</td>
</tr>
<tr>
<td>G 1.1</td>
<td>50 000</td>
<td>34</td>
<td>18</td>
<td>normal</td>
<td>normal</td>
</tr>
</tbody>
</table>

DW 1: impression on, colour: magenta, damping as in table
DW 2: impression off, with dummy plates, damping as in table
DW 3: impression on, colour: black, damping normal
DW 4: impression off, with dummy plates, damping off

Damping: Normal: damping under production conditions
N+20%: 20% more damping agent than normal
N+50%: 50% more damping agent than normal
----: switched off

Printing speed: 50,000 copies/h correspond to a web speed of 7 m/sec.

Figure 10: Rel. stretching recorded during tests carried out with the blanket-to-blanket configuration of the «Abendzeitung» press.
1. At approx. 25°C and 55% relative humidity, the tensile strength must be greater than 200 daN/m.

2. The ratio between longitudinal and cross tensile limits must be greater than 1:2.5.

3. In the lower range of the longitudinal tension/stretch characteristic (up to app. 60 daN/m), the ratio between tensions (σdry and σhum) must be less than 2:1 at 10% moisture content.

4. In the tension/stretch characteristic in cross direction, the difference between stretch when dry and with 10% water added (Δl = qhum - qdry) at 10 daN/m should not exceed 0.26%.

Source: E. Glöckner, KBA