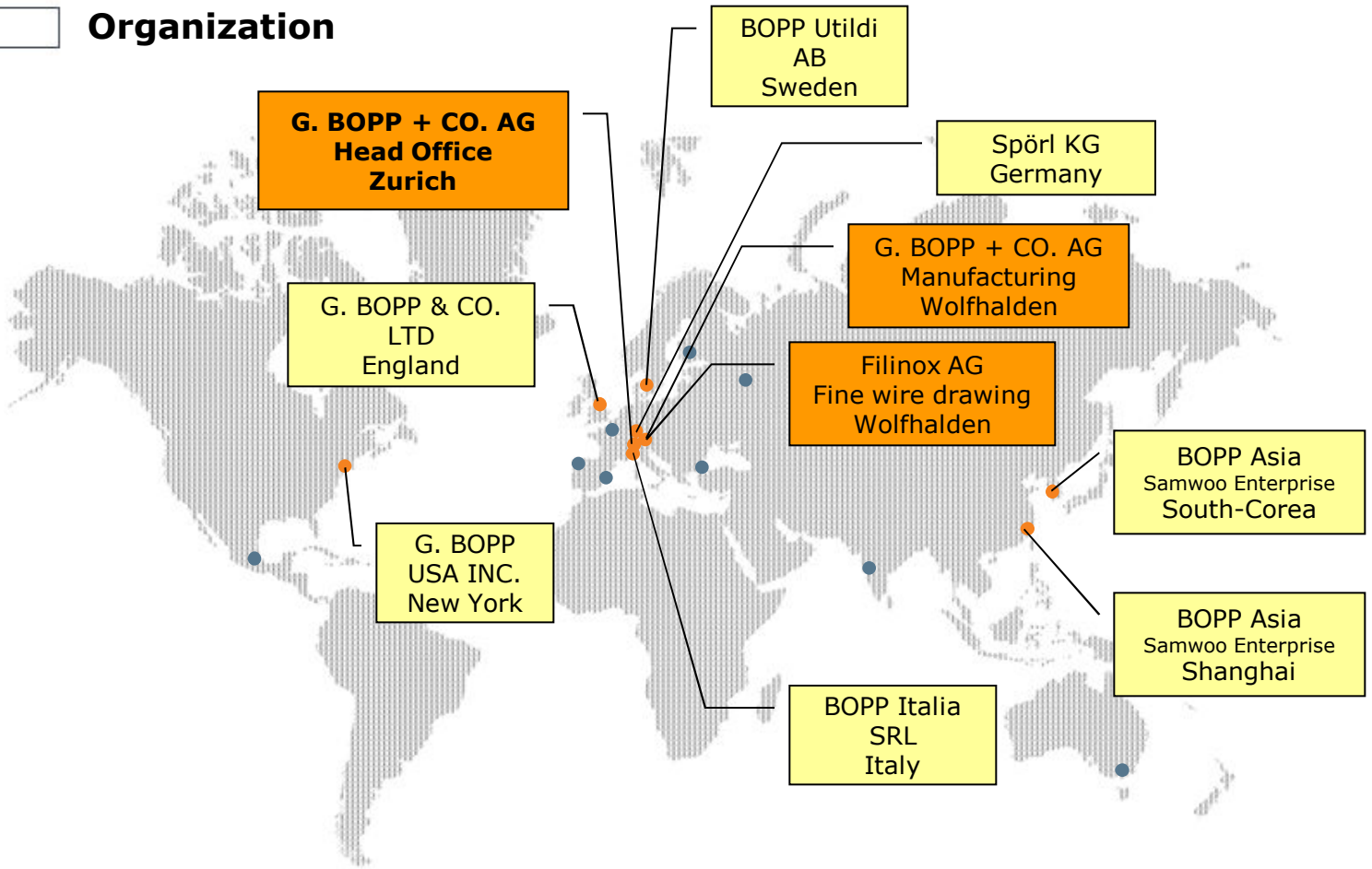
Swiss precision woven fine wire cloth for applications worldwide

Organization



From wire to premium mesh

- Definition of specifications
- Procurement
- Wire drawing
- Wire inspection
- Processing
- Weaving
- Mesh inspection

FILINOX AG: fine wire drawing in Wolfhalden

- Fine wire drawing on site at the BOPP factory in Wolfhalden
- Established in 1979
- 30 employees

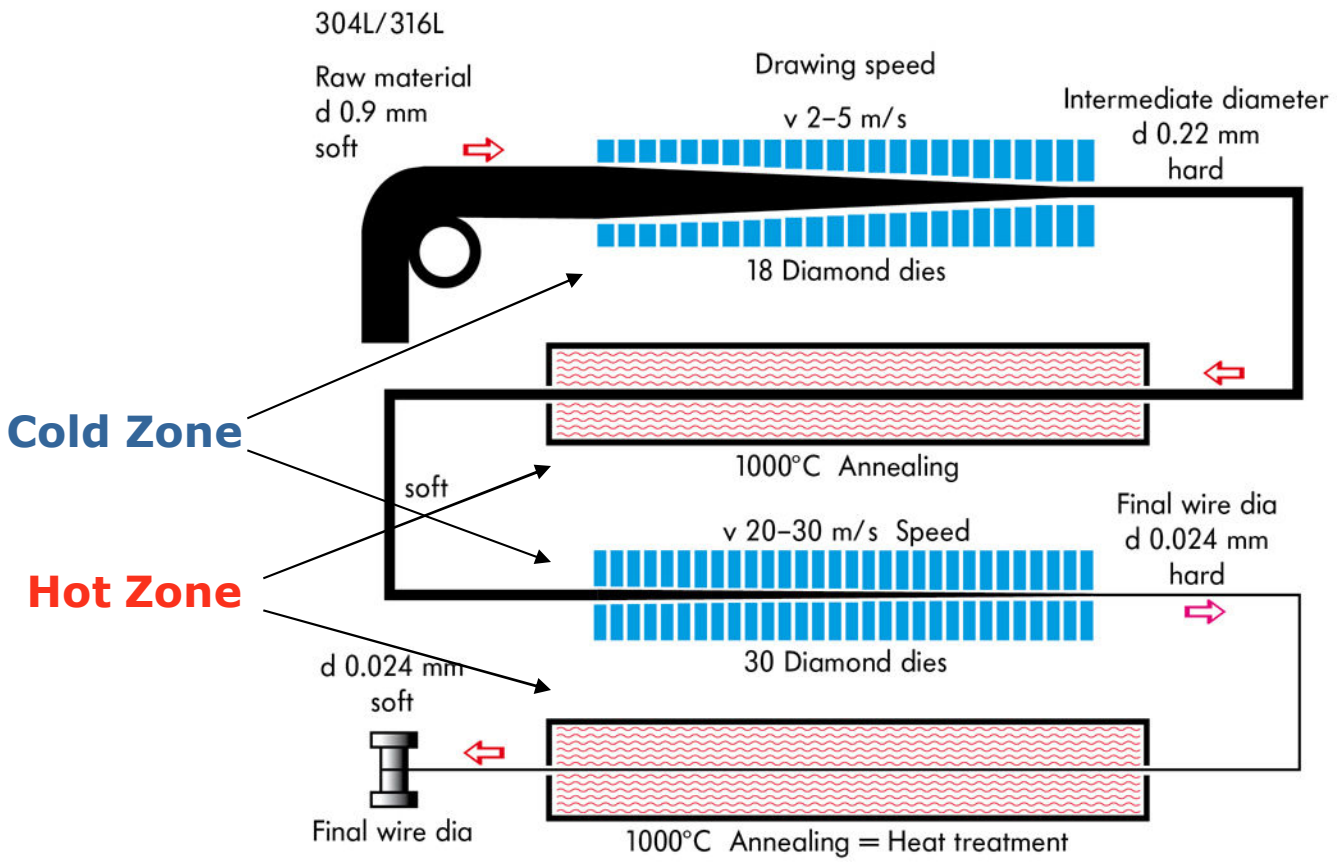
FILINOX FEINDRAHTZIEHEREI

- Production range 18 – 100 µ, stainless steel AISI 304/316
- Producing approximately 1.5 million meters per day, 50 tonnes per year
- Provides approximately 50% of the total weaving mill requirement for stainless steel wire

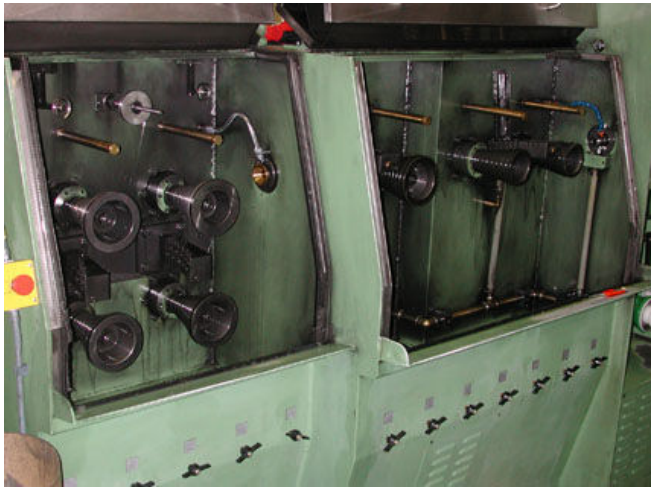
The highest standards of procurement and processing

- Semi-finished product delivered as ∅ 0.9 mm wire
- Controlled availability, sustained market price
- Quality often poor after sintering
- Contaminants cause breakages in fine wires: Maximum size of foreign particle 1/10 of wire diameter

The wire drawing process

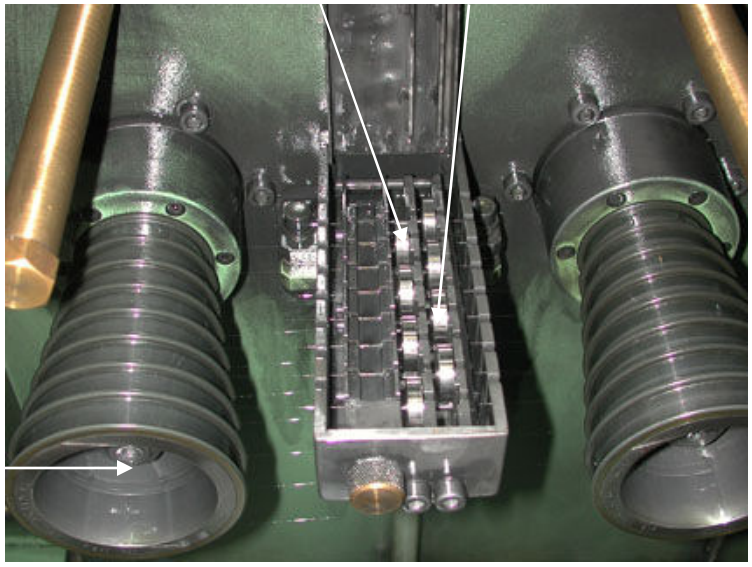


Filinox wire drawing



Wire drawing equipment

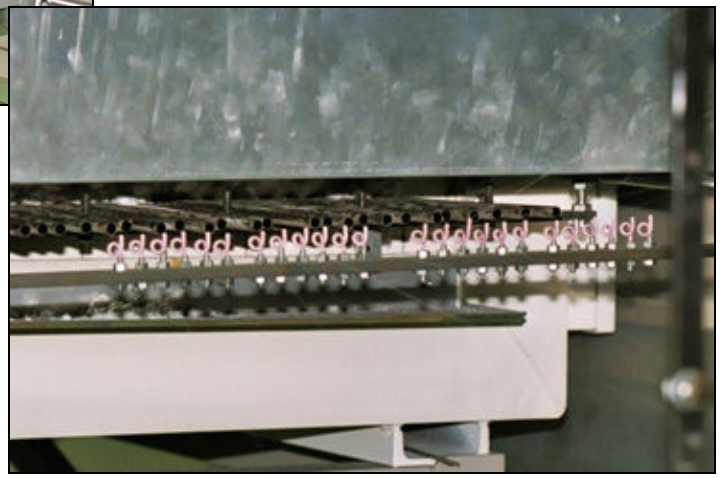
Drawing dies



Shaft drive

Annealing the wires

Annealing oven to 1130°C



Pipe ducts filled with nitrogen and hydrogen prevent spoilage due to excess annealing temperatures and carbonisation, ensuring a bright, gleaming wire surface

Inspection, processing

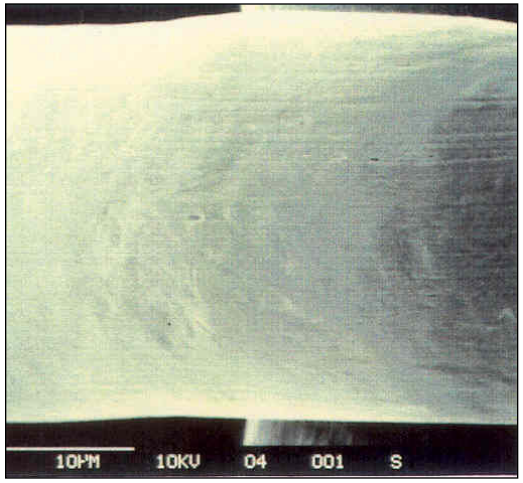
- Final inspection for twist and tensile strength
- Classifying according to homogenous values
- Winding on warp and weft spools
- Traceability
  - Semi finished product batches
  - Machine number
  - Employee number

Principal wire properties

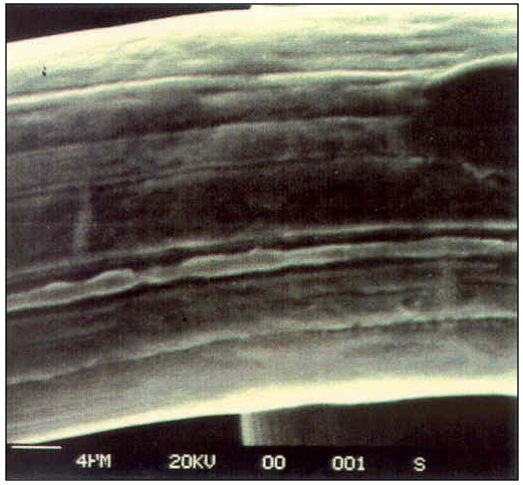
- High tensile strength:
  Vital for the production of good screen printing stencils

- Smooth surface area:
  Vital for good colour, paste and filtrate throughput

Smooth surface area



Rough surface area



The Wolfhalden weaving mill

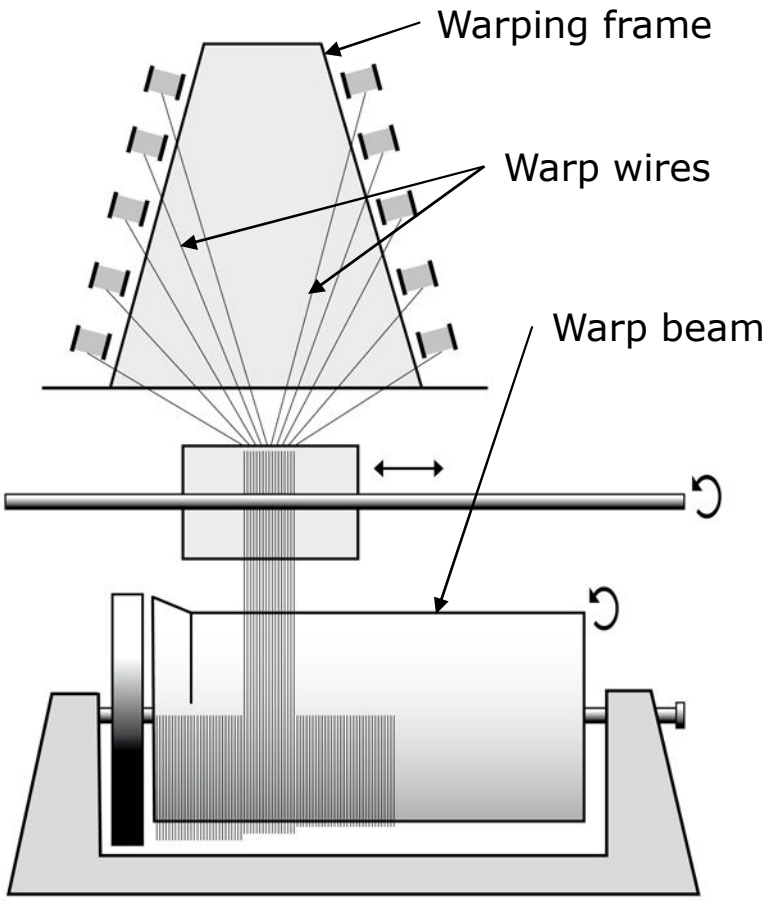
- Constructed in 1956, most recent expansion 2008
- 105 employees, 2 shifts
- 145 looms
- 170 tonnes of metal processed each year
- 17.5 million kilometers of wire processed each year
- 340 kilometers of mesh produced each year
- Fine wire cloth to Ø 0.0180 mm (18µ wire diameter)
- New, fully air conditioned weaving hall
- Special vibration-free foundations
- Cleanroom classification 100‘000, 10‘000 in new weaving hall

Warping: Winding the warp wires

- Winding the warp wires on the warp beam
- Warping frame accommodates 1000 spools
- Winding: in bundles

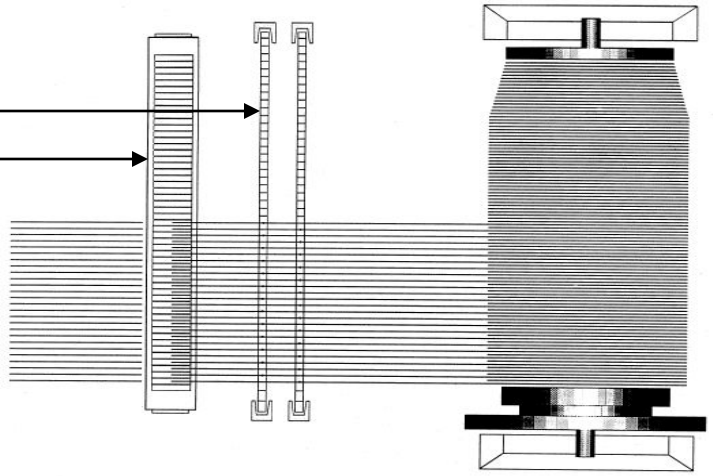
Example:

- 200 Mesh → 8000 wires on a 1m width
- 400 Mesh → 16‘000 wires on a 1m width
- Average work content: 33 hours



Feeding: Preparation for weaving

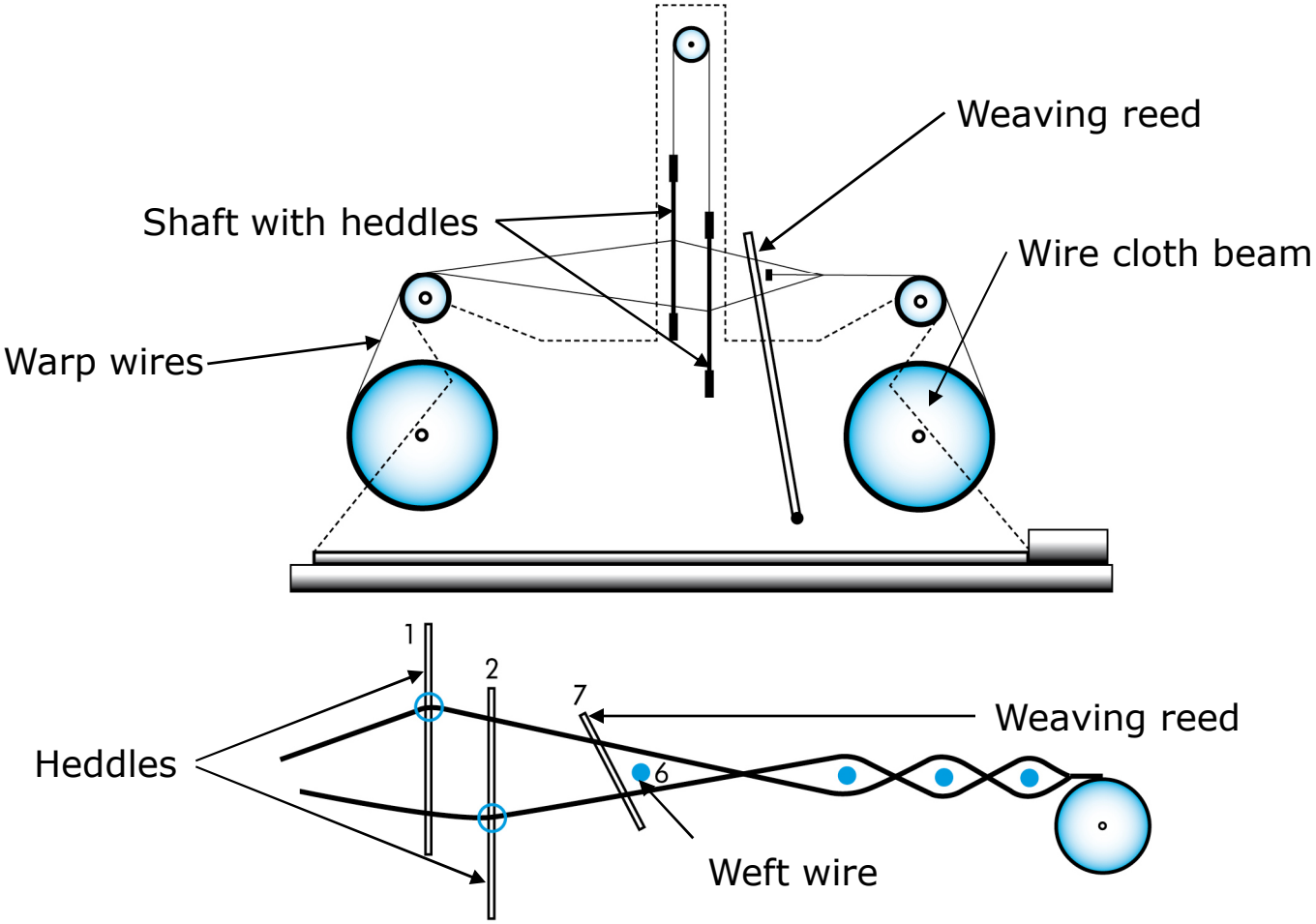
- Every wire passes through an opening in the heddle and then through the weaving reed
- Extremely demanding, for: Zero error tolerance
- The finer the wire cloth, the greater the challenges



Examples:

- 200 Mesh, ∅ 40 µ
  8000 wires/1m width
  Preparation time 36 hours
- 400 Mesh, ∅ 25 µ
  16‘000 wires/1m width
  Preparation time 88 hours

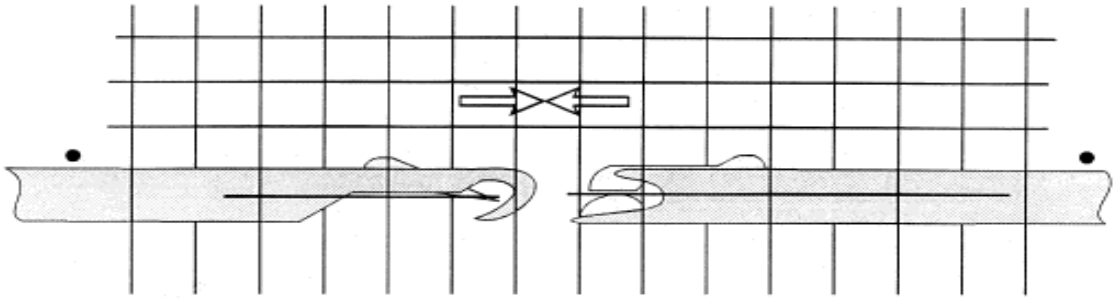
Weaving loom operating modes



Weaving process: Weft transfer

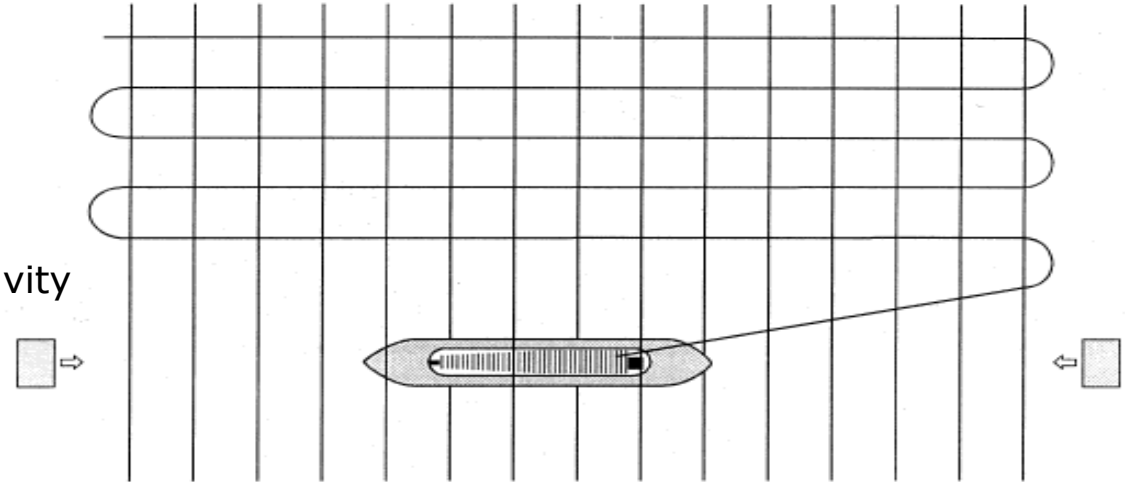
TODAY:

Rapier type
- Belt drive
- Pole gripper



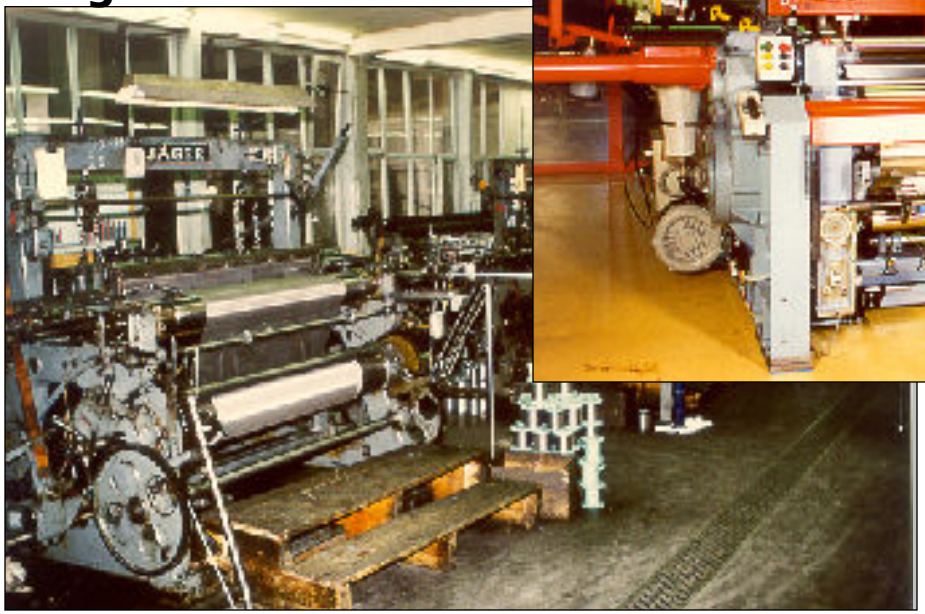
YESTERDAY:

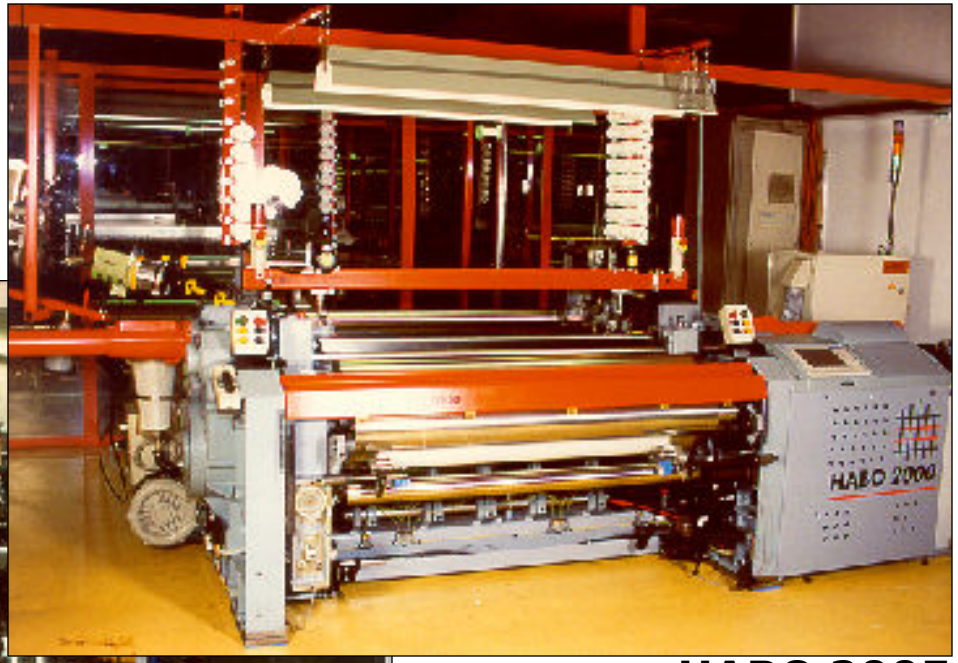
Shuttle looms
- outdated, slow
- reduced productivity



Weaving looms – yesterday and today

Jaeger ca. 1960

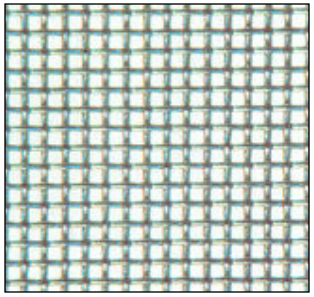




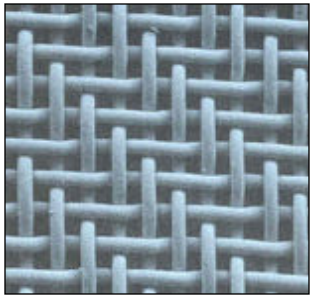
HABO 2005

Quality control

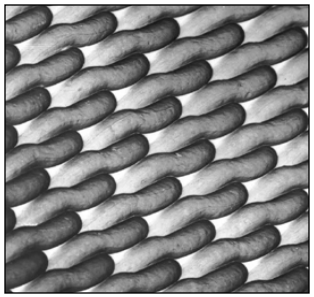
Weaving quality
- BOPP standard BN, more stringent than ISO-Standards
- reduced weaving defects
- increased precision



Final inspection
- SD: mesh thickness
- SI: aperture size
- FI: optical light inspection (pin holes)



Traceability
- Semi finished goods batches
- Loom number
- Employee number



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