Knitting Production Advances Impacting Design and Development (Tube and Flat Knit, etc.)

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The Landscape of Machines and Techniques

- V Bed (Flat Knitting Machine)
  - Single shoe
  - Multiple shoes
- Circular Machines
  - Complete Diameter
  - Partial Knitting
  - Sock/Shoe
  - Spacer Knits
- Warp Knitting
  - Multiple shoe
  - Spacer knits
  - Seamless
- Trends

4D Knitting Modern Shoe Construction

4D knitting is changing the way athletic shoes are made.

A one-piece upper design is produced by a V Bed knitting machine then assembled with the tongue, lining materials, and reinforcements. This knitting technology once found only on expensive shoes is rapidly expanding to lower-priced shoes.

Shoelace Loops knitted in

Environmental Impact

- The footwear industry has dramatically decreased its impact on the environment over the past decade.
- This one of the biggest benefits of brands implementing knitted fabrics into manufacturing.

V Bed 4D (Flat Knitting Machine)

Advantages

- Complete one-piece upper design
- No Cutting
- No sewing
- Made to measure
- Customizable
- Less Waste?
- Recycle fibres
- Make each size

Disadvantages

- Very Slow Production
- High investment in equipment
- Make each size

https://www.youtube.com/watch?v=RFW8yz8pyHI

SHOE KNITTING MACHINE LONGXING

https://youtu.be/XSV3wM-B_kc

V Bed (Flat Knitting Machine) Across the Whole Bed

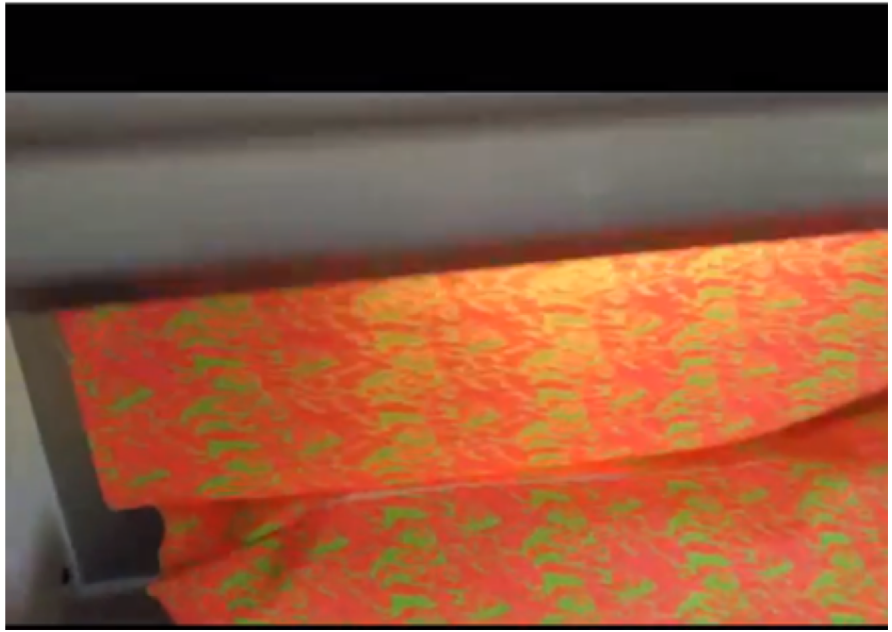
Advantages

- Simple set up
- Faster to knit
- Blanket production
- Laser Cutting
- All sizes

Disadvantages

- Slow Production
- High investment in equipment
- Make each size

Blanket fabric



https://www.youtube.com/watch?v=klLrb5Kna6E

Circular (non partial) (Flat Knitting Machine)

Advantages

- more productive than a flat knitting

Disadvantages

- Simpler design
- High investment in equipment
- Make each size

https://www.youtube.com/watch?v=UbZAn7SvOtA

GBOS LASER v

Knitting uppers automatically cutting and stitch locking

https://youtu.be/7WGw_uqtnm0

Mec-Mor open machine for the footwear market

https://www.youtube.com/watch?v=_DFT-v9rbFo

Circular partial knitting

Advantages

- Lightness - as the knitting structure allows better stretch so giving a feel-good experience just like wearing a sock
- Better form fitting - due to new shapes, angles and materials that wrap the foot in an adaptive support
- Sustainability - as the variable fabric panel permits a limited and controlled wastage and can knit re-cycled yarns as well
- The mixing of different technical yarns and specific mapping of various areas of the uppers with dedicated meshes so guaranteeing both breathability and high performance
- All the required operations can be obtained directly on the machine with a single operation
- Aesthetically pleasing result - as the finer 20-gauge machine allows a higher resolution that enables higher customization of the product

Disadvantages

- Very Slow Production
- High investment in equipment
- Make each size

https://youtu.be/tEg5koH_LKQ

It was a sock... and now it is a shoe

S1+ Circular Machine

Eliminating the wasted material offering 100% sustainability

http://www.colosio.it/media/s1/colosio-depliant-s1.pdf

Santoni X Machine

Santoi + Lonati
Weave countless intarsia knit articles and create seamless uppers.

The machine allows different areas to be mapped according to the type of yarn used and the various combinations chosen so that the final product is ready for the application of the sole, the final phase of production for the shoes.
http://www.lonati.com/en-machines-shoes.asp

Karl Mayer

- Warp-knitted textiles for sports and leisure shoes
- Machines for developing innovative, high-performance shoe fabrics
    - Single-face tricot fabrics
    - Patterned spacer textiles
    - Engineered jacquard fabrics
    - Lace

https://www.youtube.com/watch?v=J2wWdeL6YSE

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