




SEWING PROCESS TRANSPORT

Materials handling



Logistic and transport system

- Possibility of improvement
 - In clothing industry **transport** and **material handling** is a great deal of the whole technological process
 - Scientific branch called logistic deals with optimization of transport and material handling, transport of energy and transport of information
 - In production process there must be **material + energy + information at right time at right place.**
Time is very important factor
 - At EU approximately 40% of workers deal with handling and transport of material in production.
This time is , of course non-production time.

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- Application of logistic rule is important for:
 - Improving of productivity
 - Reduce – through put time
 - Allowing true quick response to market demands
 - Reducing work in process production optimization
 - Improving quality control
 - Storage, stock administration and commissioning are electronically controlled and monitored – big profit!!!

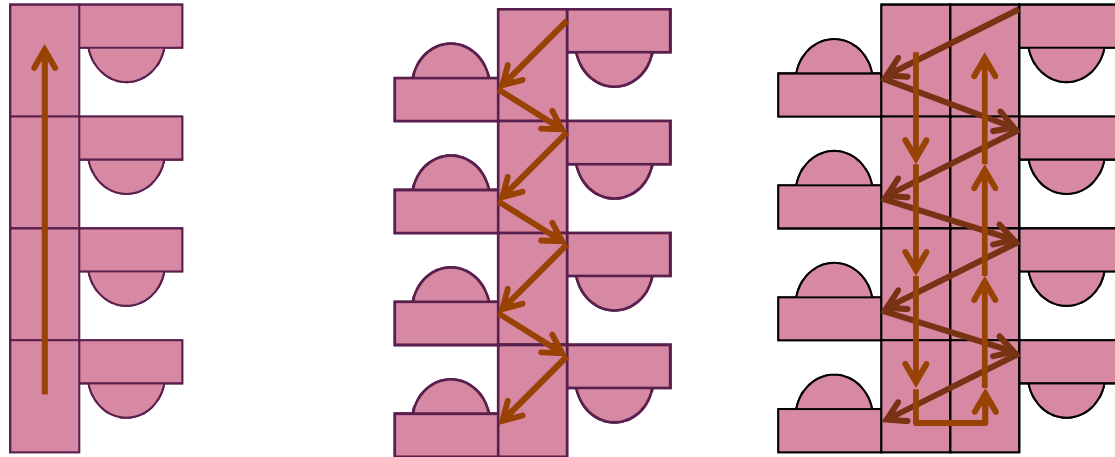


Sewing process transport

- Great influence on the level of organization of the production process
- 2 basic function
 - Continuity of supply
 - Minimization of handling times
- The transport system is always on the left side of the worker
- The flow of production is from back to front - mostly
- Systems of sewing process transport
 - **Transfer system**
 - **Trolley system**
 - **Conveyor system**

Transfer system

- No auxiliary elements
- Transfer of work in progress from one place to another
- Too much production – loss of control (overview)
- Time-consuming to maintain the correct sequence of piece production when searching for serial numbers
- Use of transfer tables
 - For transport of products (semi-products)
 - For storage of products (semi-products)
 - Location on the left side of the sewing or ironing machine
 - Sorting not into an infinite row - an interruption for a transport route or for access to workers
- The use of tables is the least demanding in terms of space and investment



Shannon, R. Auto Layout Design For Long Sleeve Shirt. [online] 2017. Available from: <https://www.achievementlearn.com/auto-layout-design-for-long-sleeve-shirt/>

Transfer system

- The use of tables is the least demanding in terms of space and investment



- Not very productive for medium and large production units
- Bad overview of the production process



- Low space requirements - approx. 10 m² per workplace

Trolley system

- Universal in the case of product changes
- Possibility of transport between any workplaces
- Trolley type - according to a certain production section (front parts, sleeves, assembly...)
- Easy handling during transport with a maximum number of pieces
- Easier handling during sewing
- need to provide feedback - return the trolleys to their starting position (in production flow)

Trolley system



Trolley system

- Inter-operative and inter-departmental transport - a wide range of different types of trolleys
 - Different attachments for different types of clothing products
 - Different height
 - Orientation of the trolley to a certain type of product and production section
- General requirements for trolleys
 - Space-saving - approx. 12 m² per workplace
 - Easy handling, anti-dust wheels
 - Trolley height - best adjustable
 - Prevent products from falling out of the trolley
 - Trolley records - records of products on trolleys

Trolleys

For the **pre-assembly section**,
i.e.. front parts,
back parts -
women's and men's
jackets, vests.....



For **sleeves** (capacity up to 120
pairs of sleeves)

For **lining** and **sleeves**. Baskets for small parts, special
holder for collars, anti-slip board treatment..



For the assembly section of
trousers - for the assembly
of side and step seams.
Special wheels against
clogging of textile residues
and threads



Přidal s.r.o.
<http://www.pridal.cz/>

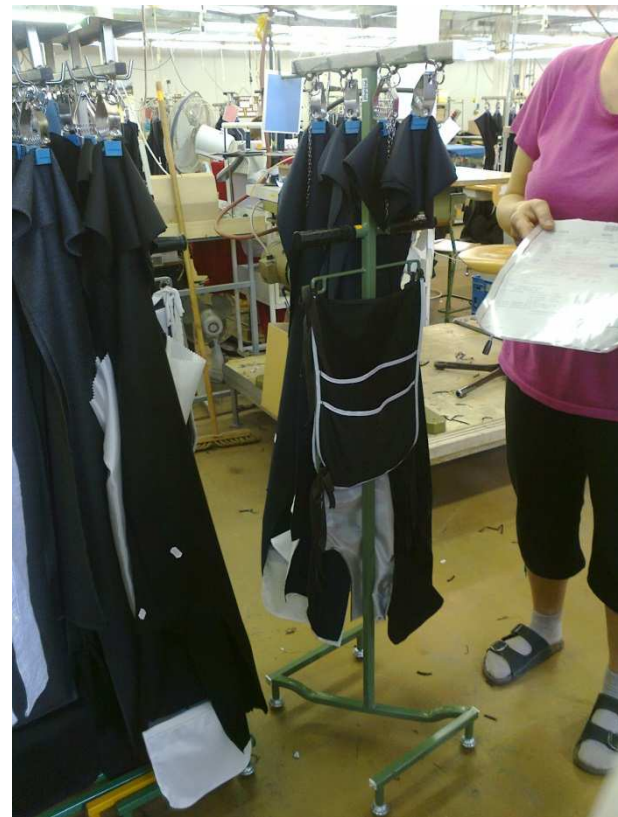
Trolleys



Stand - height and width adjustable.
Designed for hanging **products on hangers**.
For all types of products. Application in
ironing, finishing, assembly. For inter-
operational and inter-sectional transport.



For the transport of standardized boxes with
small parts.

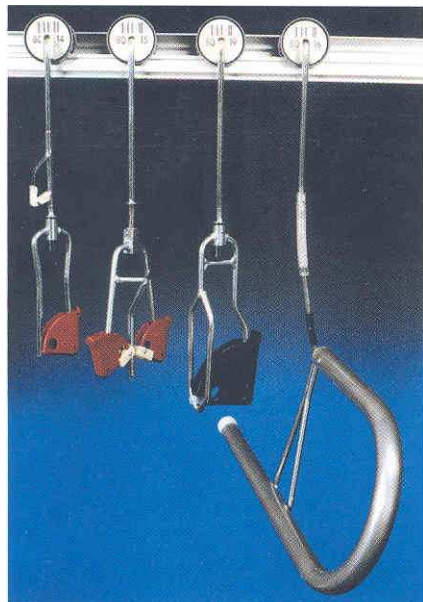
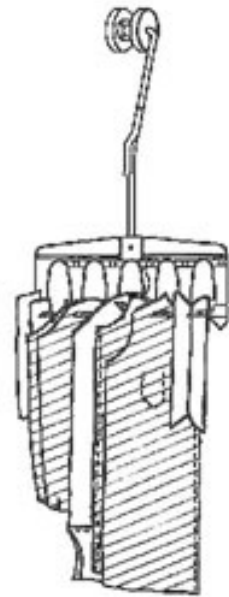
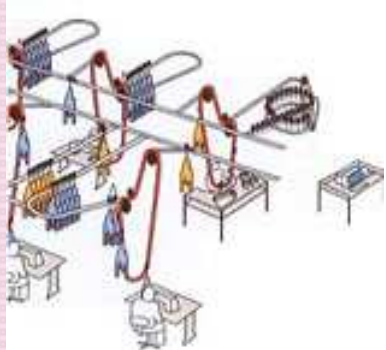
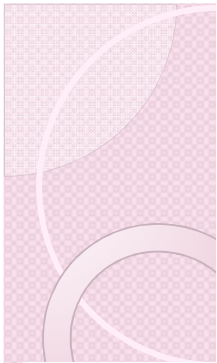






Conveyor system

- The most suitable method of inter-operational transport
- The most space consuming
- The hanger moves along a certain path
- Utilization of natural **drapability** of textiles
- **Shapes stability** of textile products obtained by ironing
- Possibility of **handling** the product **close to the workplace**
- Use mainly in the ironing, finishing process, in warehouses of finished products and in assembly sections



- Reason for use:

- > Maximum mechanization
- > Transport automation
- > Labour savings
- > Increase labour productivity
- > Better working conditions (aesthetics of the working environment)

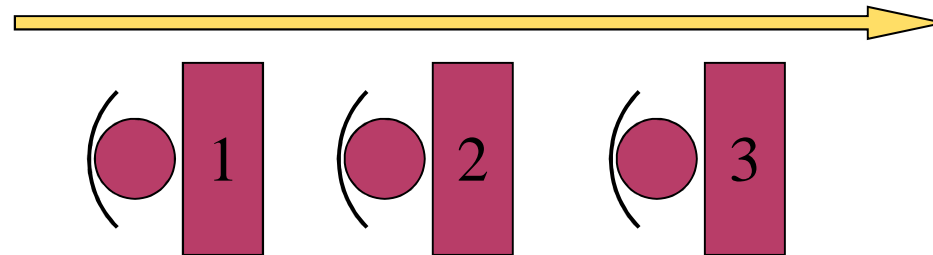


Conveyor system

- Conveyor system layout:
 - **Linear** – workplaces in a row
 - **Nonlinear**
 - **Cellular** – workplaces into cells; linear supply or bridge transfer
 - **Group (nesting)** – workplace in a group; supply only by bridge transfer

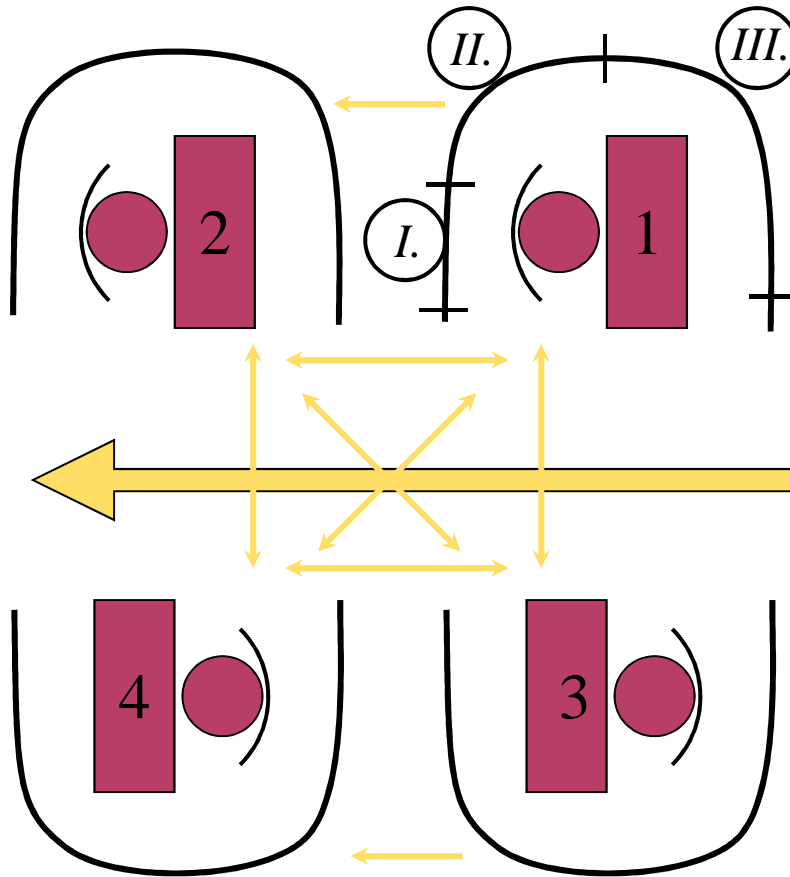


Linear conveyor system



- Fast direct transport between workplaces
- Easy handling
- BUT! \Rightarrow strict linearity (if one workstation stops
- all others also stop)
- Small inter-operational stock (supply)
- Use for simple productions without multiple workplaces

Nonlinear conveyor system



- **Section I.** inter-operational stock (for processing)
- **Section II.** product handling (closest to the work area)
- **Section III.** stock of processed parts (stock for next workplace)





Textile Machinery Association of Sweden. Materials handling for Industry 4.0 concepts from Eton Systems [online]. ©2019. Available from: <https://www.tmas.se/2019/03/27/materials-handling-for-industry-4-0-concepts-from-eton-systems/>

Overhead conveyor system

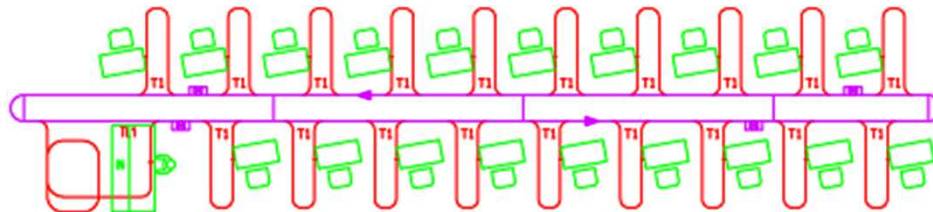
- In terms of handling
 - **With manual load shifting**
 - **Mechanical**
 - The transport is managed by the operator himself
 - Mechanical movement of the load
 - **Addressable**
 - The hanger has an address of workspace!
 - Intelligent

⊙ Producers:

- ETON
- GERBER
- DÜRKOPP
- VEIT

- + INVESTRONICA
- + SCHÖNENBERGER
- + ISELI
- + System VÚO Prostějov

Defunct companies



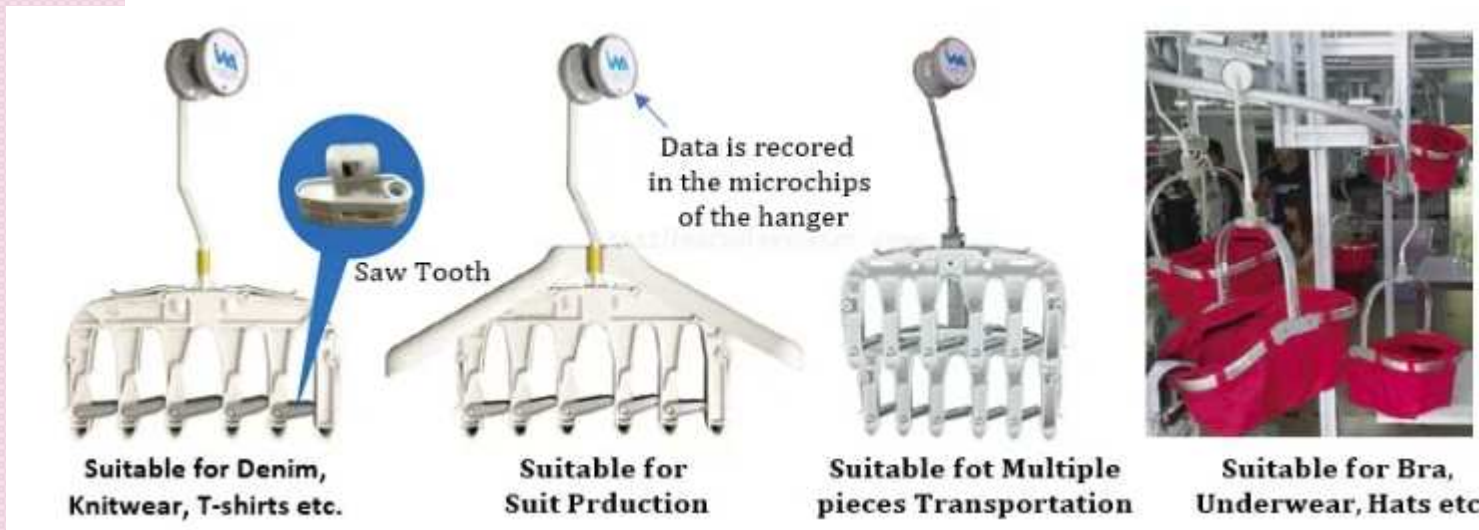


Overhead conveyor system with manual load shifting

- The simplest conveyors
- The basic track from the metallurgical profile is:
 - suspended from the roof structure, ceiling or walls
 - suspended on separate pillars anchored in the floor
- Track - 1900 to 1950 mm above the ground
- The hanger is moved along the track by the worker's force
- Move even several hangers in a row
- Possibility of sections of parking tracks
- Possible combination with mechanical conveyors



Evans, S. Overhead material handling system in sewing floor [online]. ©2021. Available from: <https://www.clothesoneday.com/overhead-material-handling-system-in-sewing-floor>



Sobuj, Md S. R, Unit Production System | Overhead Production System | Hanger Production System [online]. ©2018. Available from: <https://textilestudycenter.com/unit-production-systems/>



<https://www.youtube.com/watch?v=Uuiomf6e4qo>

VIDEO Exmple - Planiform's V-Rail system - monorail system for garments on hangers



Overhead conveyor system

Mechanical

- ⊙ More complicated
- ⊙ Loop-shaped track
- ⊙ Track drive - type according to the type of conveyor (electric, pneumatic)
- ⊙ Basic track design similar to a manual load conveyor
 - > Steel structure
 - > Hangers
 - > Brackets, pillars...
- ⊙ Maximum loop length - approx. 200m

Overhead conveyor system Mechanical



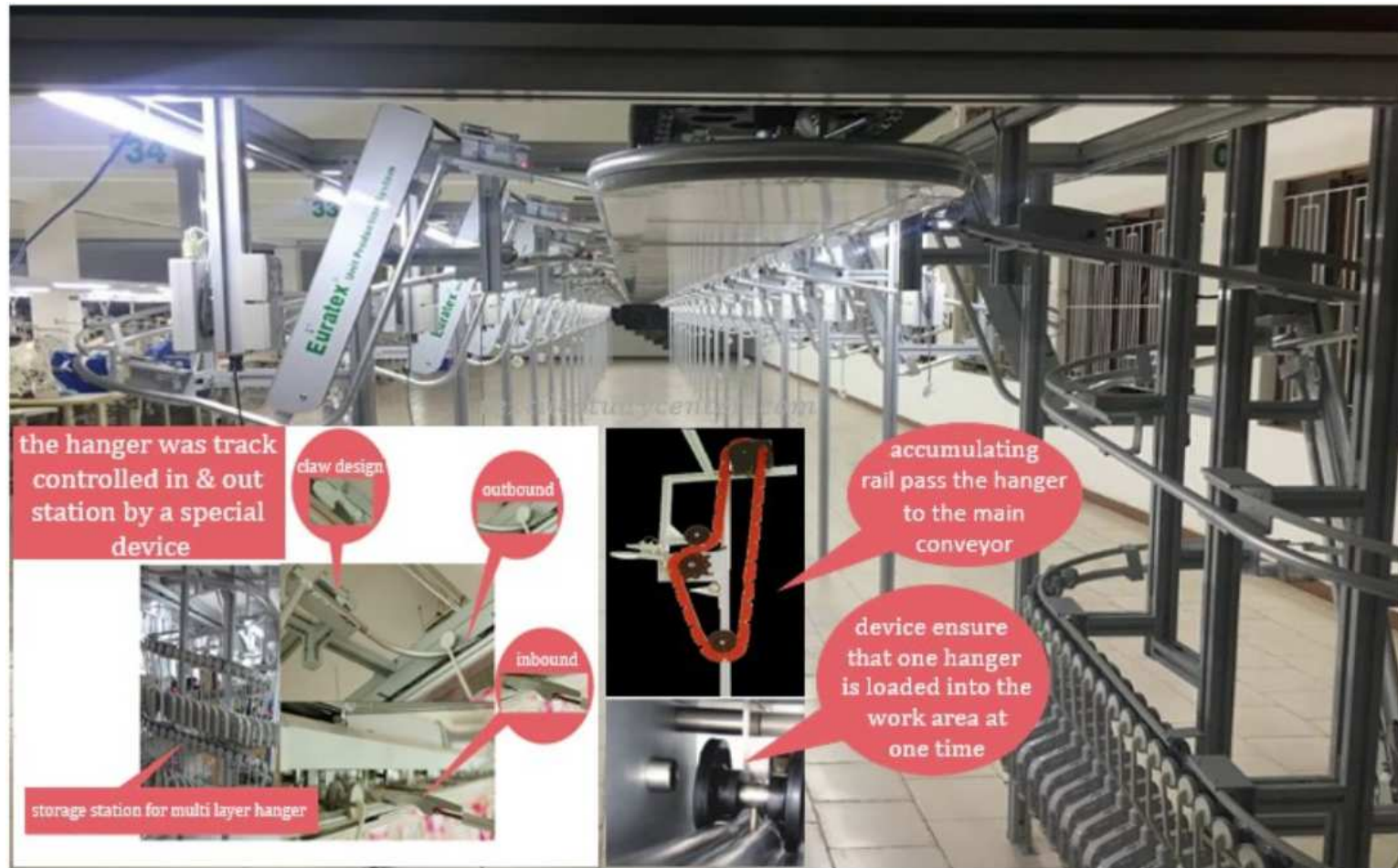
- When operator finished the operation on one hanger, a **push button** at the side of the sewing machine is gently pressed, the suspension system will automatically transfer the hanger to the main conveyor line
- LCD **display** at every station controls personal's log-in, reveals production quantity and production efficiency. At the same time can distribute the racks automatically according to the worker efficiency.

Overhead conveyor system Addressable

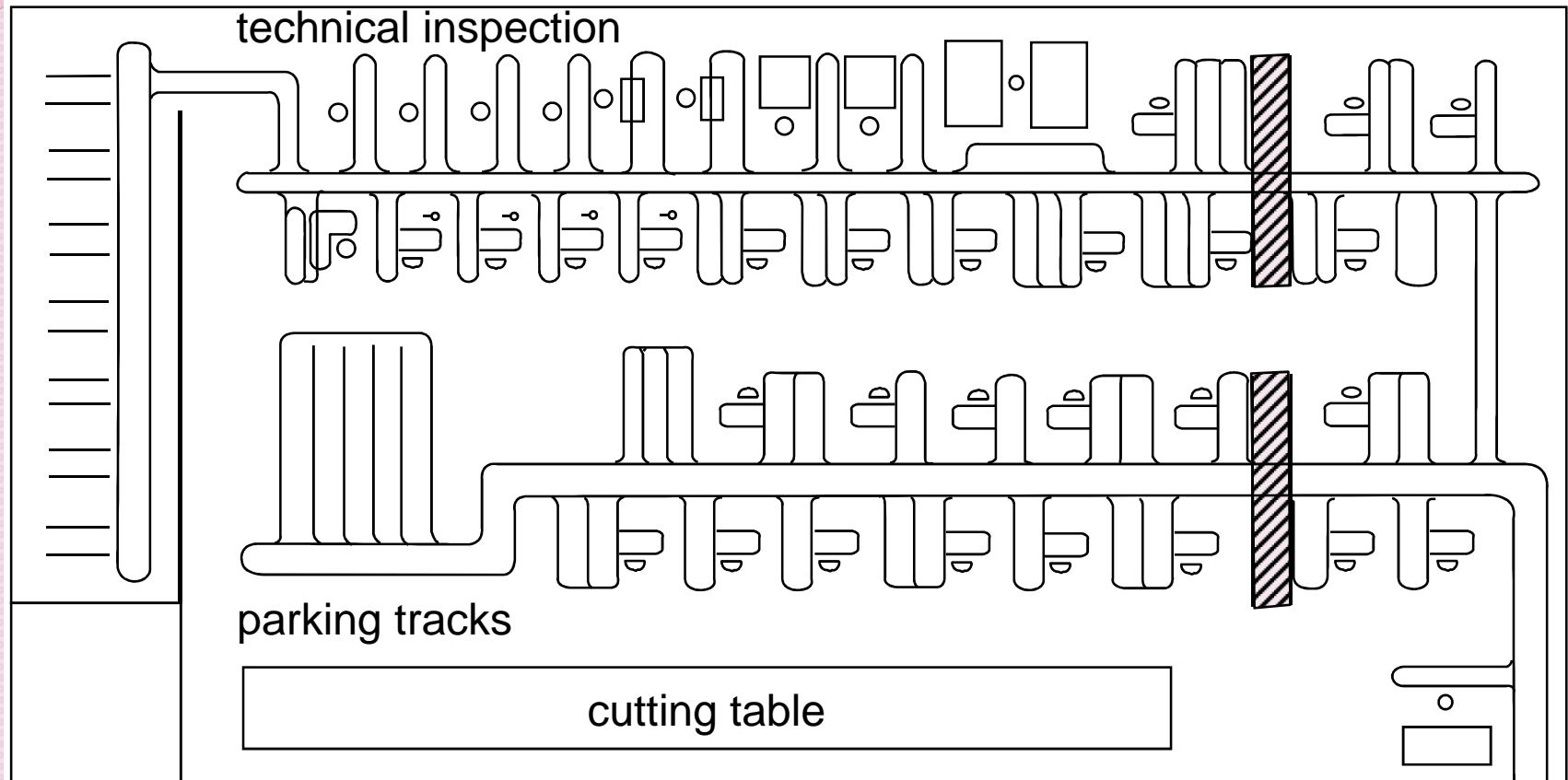


- The construction is based on the same principle as for mechanical ones
- **Addressable hanger transport system**– automated movement of products from workplace to workplace
- Possibility of **online production monitoring** ⇒ increase of work control
- Reduction of non-technological times

Overhead conveyor system Addressable



Example of a sewing process layout with a ETON conveyor system



Example of a sewing process layout with conveyor system

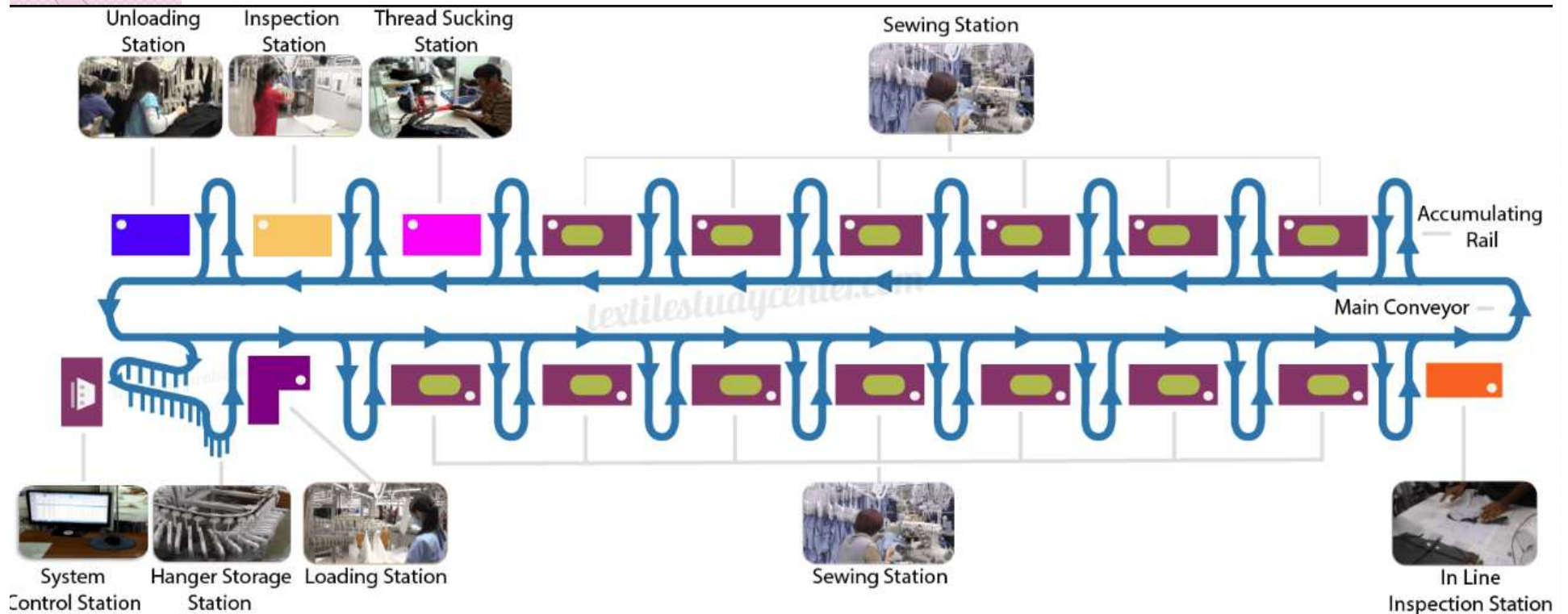
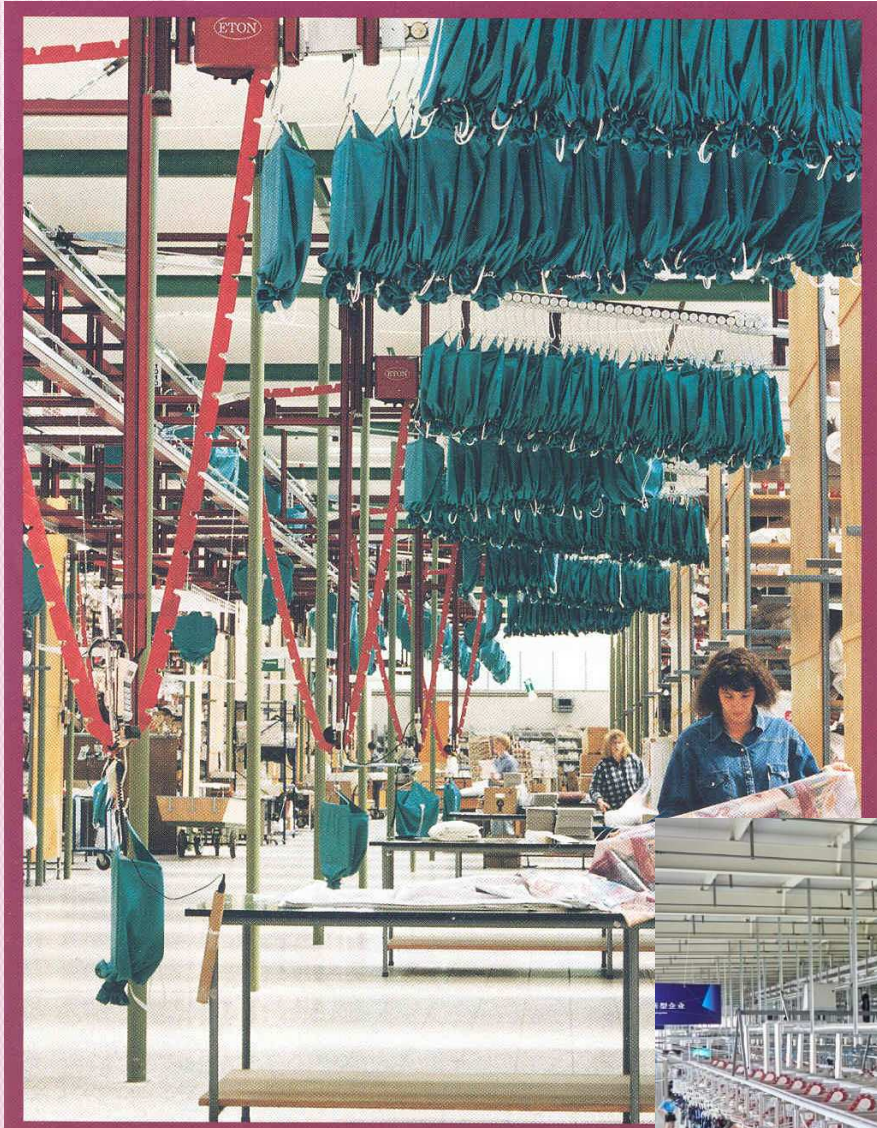
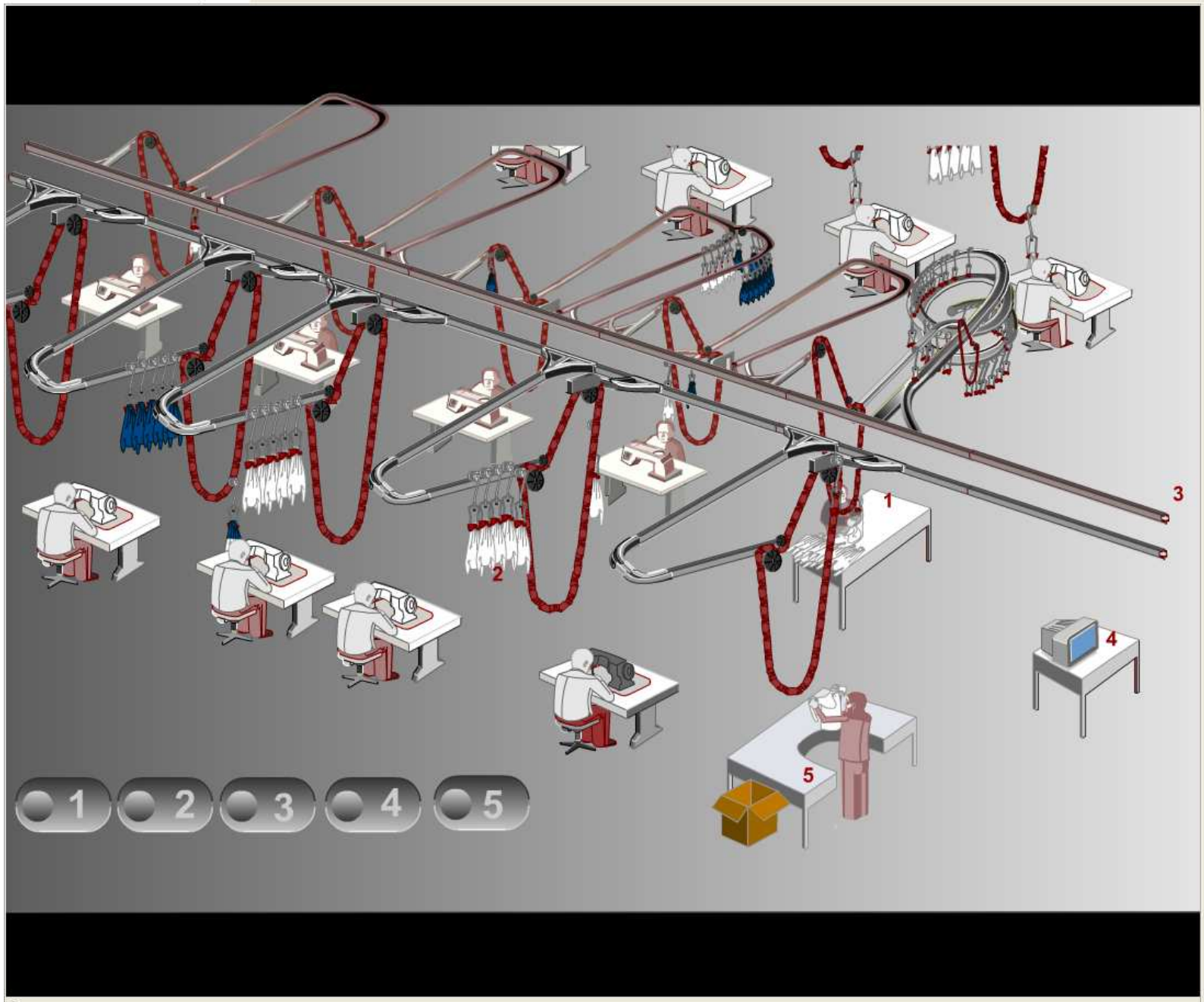


Fig: Layout of Unit Production System

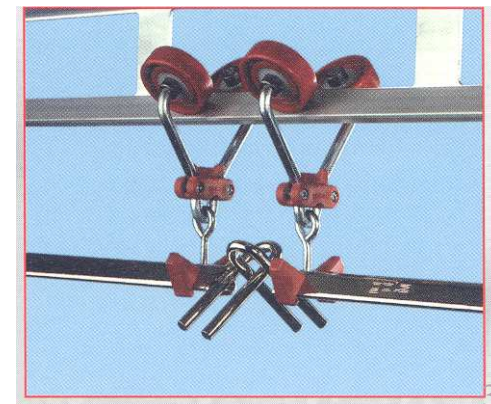
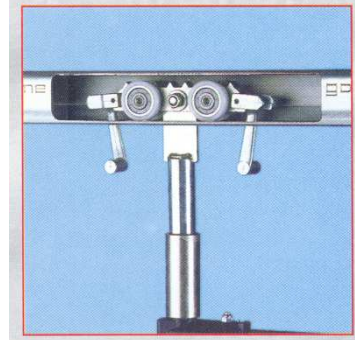
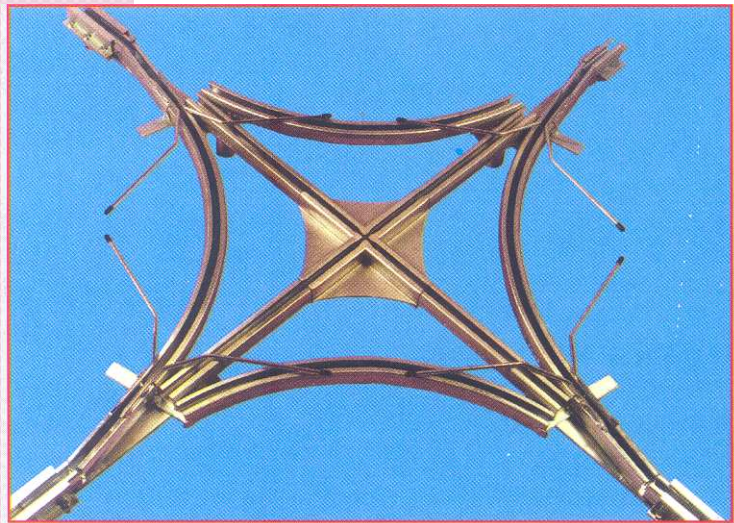
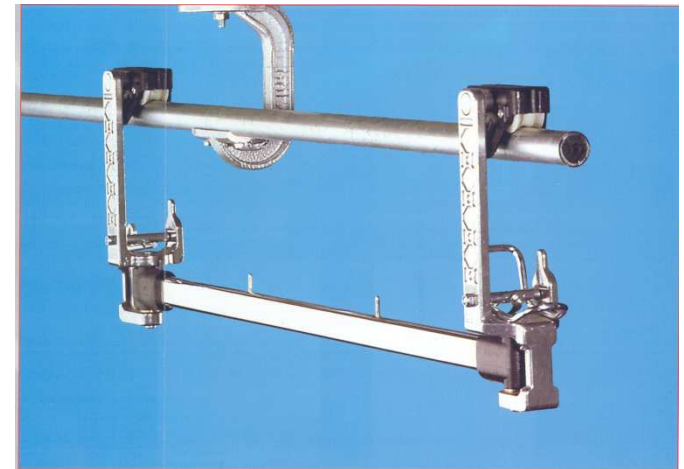
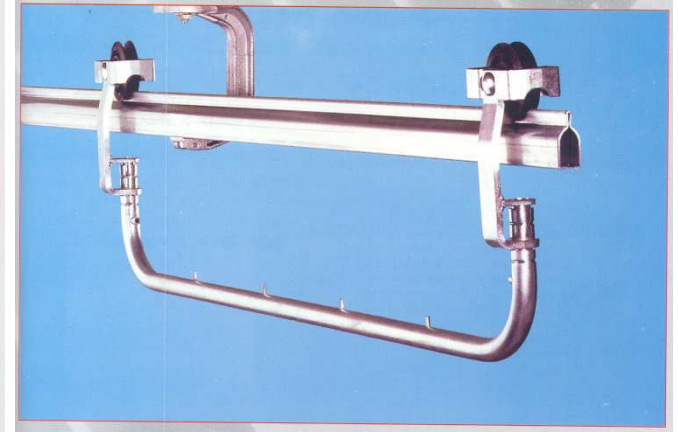


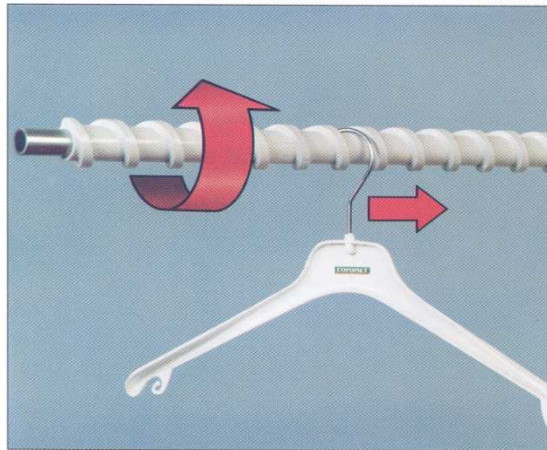
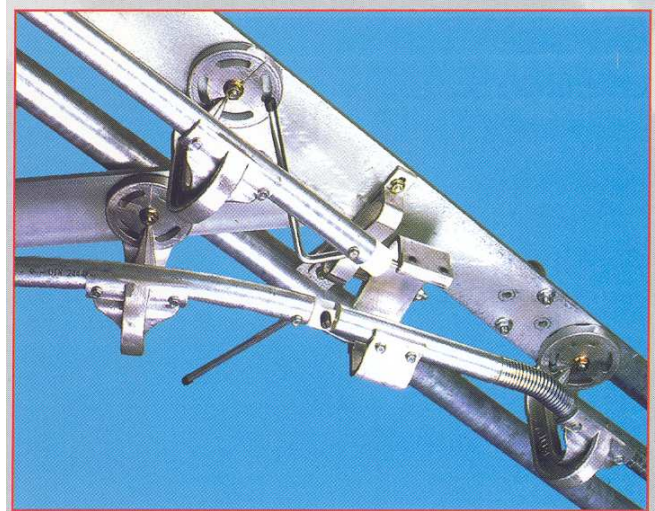
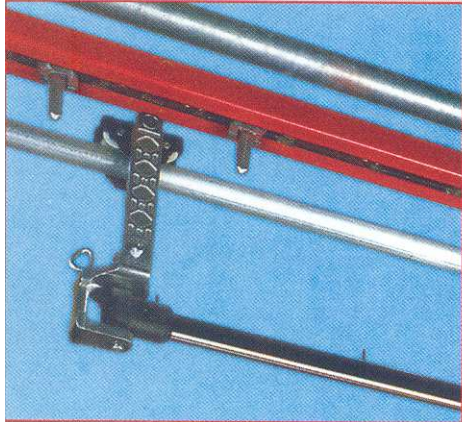
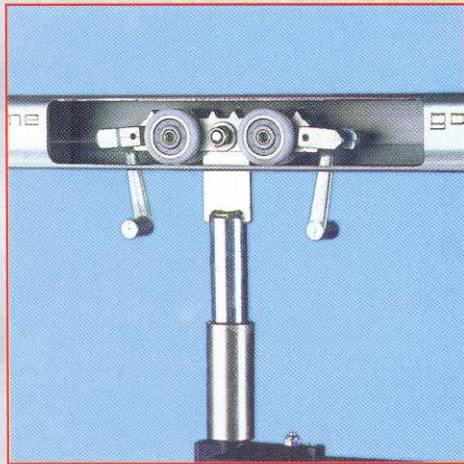
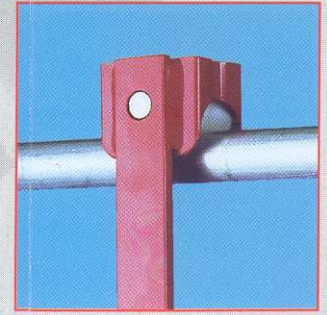
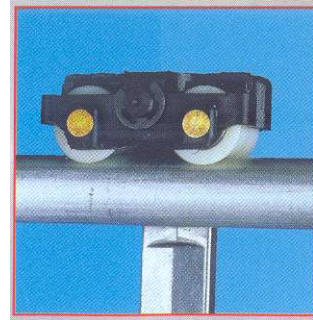
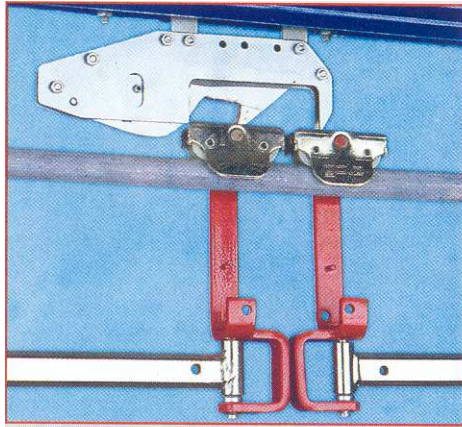
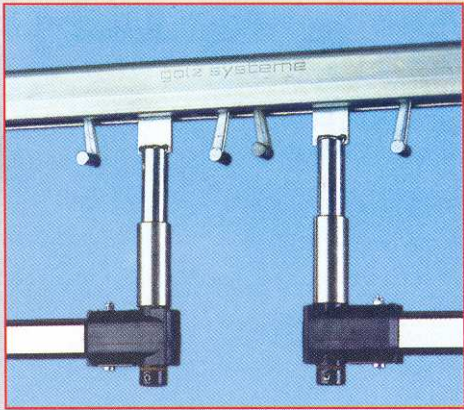




Example of production line optimization with conveyor system in Witness software







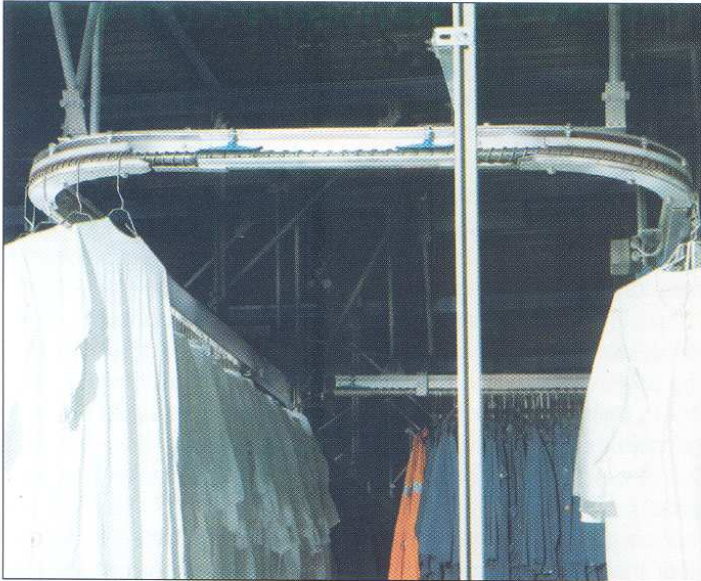
Prinzip

funcionarea principala



1. Colectia 600

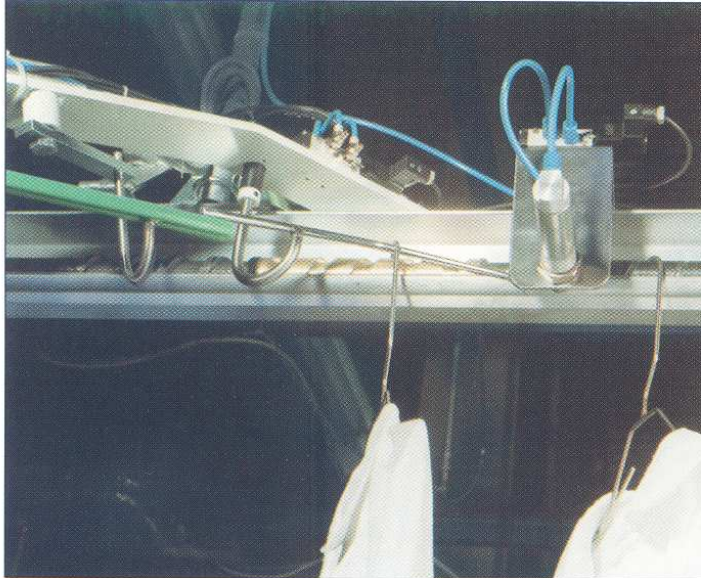
400-500



2 x 90°-Außenkurven

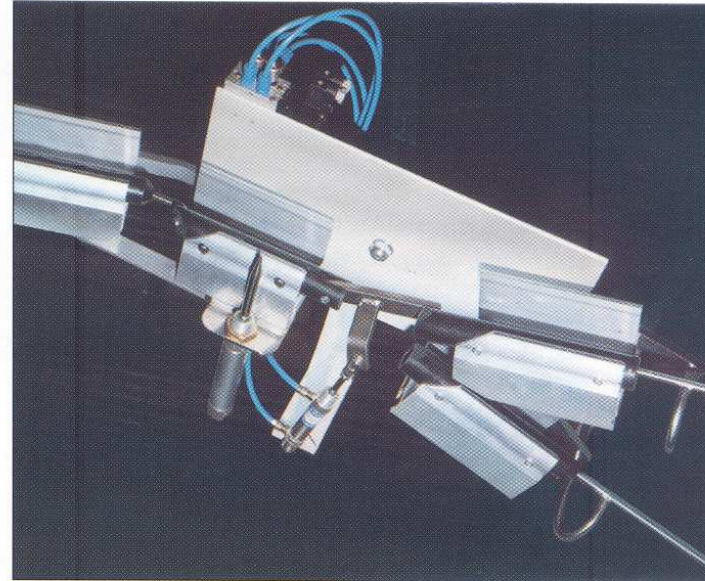
2 x 90° outside curves

7



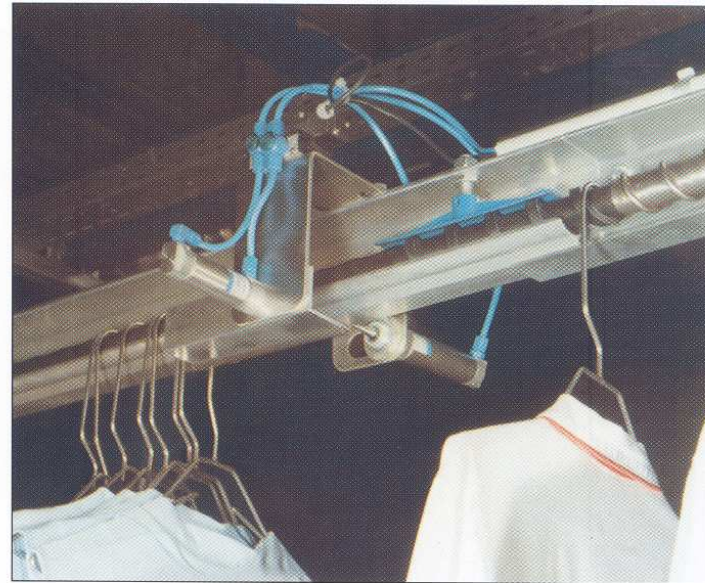
Elektro-pneumatisch betätigte
Abnahme mit Einfachstopper

electro pneumatic takeoff
with single stopper



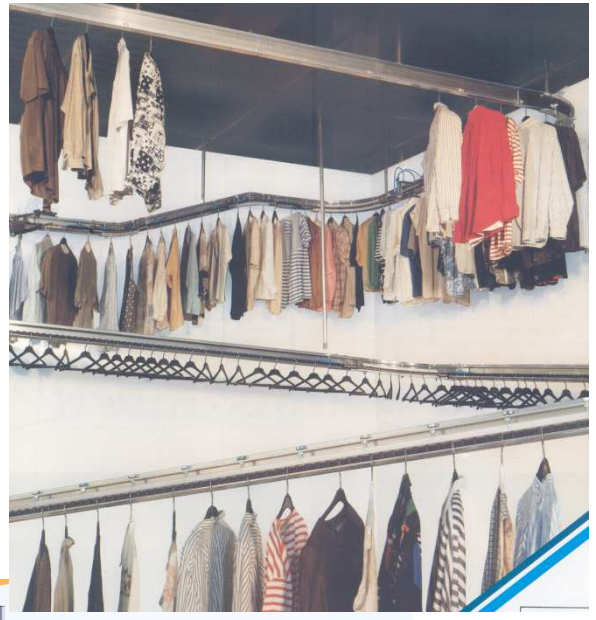
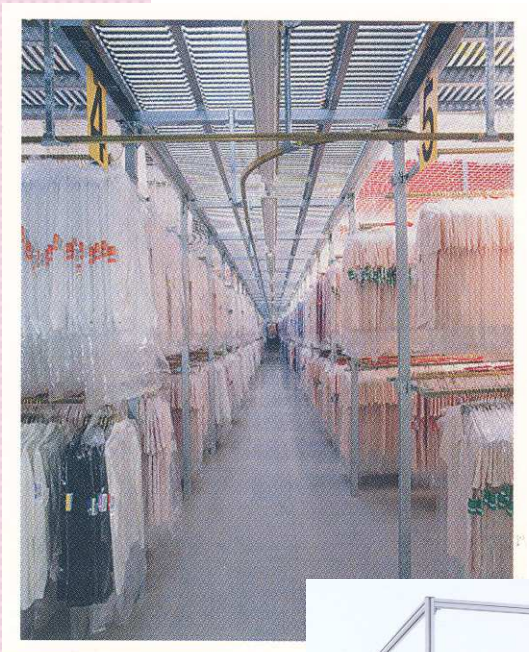
Elektro-pneumatisch betätigte Weiche electro pneumatic diverter device

8



Elektro-pneumatisch betätigte
Abnahme mit Doppelstopper

electro pneumatic takeoff
with double stopper



Links

- <http://www.youtube.com/watch?v=UKCCXKRw8eo>
- http://www.youtube.com/watch?feature=player_embedded&v=7qhMlvt0Dr0
- <http://www.youtube.com/watch?v=iak6jmMSly4>
- http://www.youtube.com/watch?feature=player_embedded&v=GqcyuGp5kF8
- <http://www.youtube.com/watch?v=uzxfAiAlVa0>





Literature

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- Eton Systems. <http://www.etonsystems.com/>