Cotton in the era of Technical textiles and its growth potential

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Scheme of the Presentation

- Cotton
- Properties of Cotton
- Technical Textiles
- Properties of Technical Textiles
- Commonalities with Cotton
- Major Cotton Based Applications
- Finding Synergies between Cotton & Technical Textiles
- Way Forward/ Conclusion.
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COTTON’S VERSATILITY, PERFORMANCE & NATURAL COMFORT

• **Gives more than it takes** –
  Using only 3% of the world’s agricultural land and water, cotton produces nearly 30% of the world’s food, fiber, clothing, and creative solutions for shelter.

• **Assures cent percent secure future** –
  Capturing more CO2 in its soil and fiber than is used to produce it, cotton gets rid of carbon dioxide from the air we breathe, providing assurance of a healthier and cleaner future.

• **Cares 24x7 for well-being** –
  For centuries, cotton rules as the most trusted fiber by consumers for its naturally soft and soothing feel, offering comfort round the clock.

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**COTTON – A PERFORMANCE FIBER BY IT’S VERY NATURE**

- **Consumer’s choicest fiber** –
  Soft, natural, comfortable, hypoallergenic, etc. are the attributes that are useful in applications that are vital for health and hygiene, thus making consumers choose cotton as their ‘next skin’

- **Reliable as environmentally friendly** –
  One of the oldest fibres with thousands of year of existence, cotton is most trusted natural resource that is renewable, biodegradable and meets the regulatory requirements as a food crop

- **Features offering user benefits** –
  Superior absorption and release capabilities, superior wet-strength are traits that enhance cotton’s use for any cleaning and hygiene product that requires exposure to water or other liquids.
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**Definition + Terminologies + Functionality of Technical Textiles**

**• Definition –**

Textiles, other than Clothing/Household fabrics, that are engineered products with a definite functionality and where the performance and applications are of greater importance than the “aesthetics” and “decorative” properties are generally termed as Technical Textiles.

**• Terminologies –**

Other terms like industrial textiles, functional textiles, engineered textiles, performance textiles, etc. are also synonymously being used instead of Technical Textiles.

**• Functionality –**

Smart textile, e-textiles, intelligent or multifunctional textiles: these names designate the textiles which can adapt to a situation that is to say to detect and react to a stimulus (electrical signal, temperature variation, stress, mechanical or chemical information).
**Technical Textiles**

- **Properties** – Technical textile materials are designed to have high level of physical, mechanical, thermal and/or chemical properties for use in specific applications in industrial sectors such as earthworks, construction, civil engineering, transport, defense, medical and healthcare.

- **Fibre types** – These textiles are manufactured using natural & man-made fibres and are usually nonwoven textile products. However, these can be woven or non-woven and be combinations of both.

- **Composition** – These textiles can be constructed as a single or multiple-layer, be composite or be coated or impregnated with material. These can be made from any fibre, yarn or filament of purely natural or synthetic origin or combination of the two.
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Commonalities with cotton

- **Natural fibres** – An analysis of materials, processes and products shows that natural fibres like cotton, also are an integral part of the re-engineering process to produce desired technical textiles.

- **Fibre facts** – Over 90% of all fibres used in the technical sector are of the conventional type as Specialty Fibres for use in technical textiles are often expensive to produce and have limited applications.

- **Consumption** – Cotton accounts for half of the world’s consumption of fibres and will remain so owing to many of its innate properties & for economical reasons.
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**Major Cotton Based Applications**

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<tr>
<th>MEDITECH</th>
<th>MOBILTECH</th>
<th>OEKOTECH</th>
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<th>AGROTECH</th>
<th>PACKTECH</th>
<th>SPORTECH</th>
<th>BUILDTECH</th>
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<tbody>
<tr>
<td>Shade Nets, Fishing Nets, Mulch Mats, Anti- Hail Nets</td>
<td>Wrapping Fabrics, Polyolefin Woven Sacks, Leno Bags, Jute Sacks</td>
<td>Sports Net, Artificial Turf, Parachute Fabrics, Tents, Swimwear</td>
<td>Cotton Canvas Tarpaulins, Floor and Wall Coverings, Canopies</td>
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<th>CLOTHTECH</th>
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<tr>
<td>Zip Fasteners, Garments, Umbrella Cloth, Shoelaces</td>
<td>Geogrids, Geonets, Geo-composites</td>
<td>Mattress and Pillow Fillings, Stuffed Toys, Blinds, Carpets</td>
<td>Converyer Belts, Vehicle Seat Belts, Bolting Cloth</td>
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- **Cationic cotton** – Treated cotton is chemically modified to possess a permanent cationic, or positive charge, making cotton “friendlier” to dye and increasing dye utilization. This in turn creates a shorter and more efficient dyeing process that utilizes less water, energy and chemicals. Cotton can be treated with the cationic process in fiber, yarn or fabric form.

- **Cotton Lints** – Linters are the very short fibres that remain on the cottonseed after ginning, and are used to produce goods such as bandages, swabs, bank notes, cotton buds and x-rays.

- **Meditech** – Some of the applications of cotton fibre in medical field are Surgical clothing gowns, Beddings, Sheets, Pillow cover, Uniforms, Surgical hosiery, etc.
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Major Cotton Based Applications

• **Protech application** – Employees working on energized conductors or circuits run the risk of serious or even fatal injury, such as electrocution. Wearing heavy cotton clothing can help protect workers, because heavy cotton clothes don’t ignite as fast as clothing made from other fabrics.

• **Flame-Resistant Cotton**
  - Cotton can be treated with flame-retardant finishes to make it resistant to ignition and combustion.
  - Flame-resistant cotton is commonly used in protective clothing for industries where there is a risk of exposure to flames or sparks, such as firefighting, welding, and industrial settings.

• **Chemical Resistant Cotton**
  - Cotton fabrics can be treated with chemical finishes or laminated with protective coatings to make them resistant to certain chemicals.
  - This makes cotton suitable for protective clothing in industries where workers may be exposed to hazardous substances.

• **High Visibility Clothing**
  - Cotton can be incorporated into high-visibility clothing by blending it with fluorescent materials or using it as a base fabric for reflective strips.
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Major Cotton Based Applications

Cotton in Filtration

- For better gasket effect during filtration, cotton filter cloth will swell in alkali solutions. Ordinary cotton cloths are suitable for neutral filter pulp under 100°C for acid filtration up to 20°C and alkali solution under 10°C. Cotton filter cloth produces no pollutions and poisoned substances to the filtration.

- Cotton is a natural plant-based fabric that is ideal for domestic and industrial filters. Its unique characteristic is the ability to swell and expand once installed in the filtration device. The swollen cotton occupies more space and increases the filter’s efficiency. Below are some additional benefits of cotton fabric as your filter media.

  - **High Absorbency:** Cotton fibers have a high absorbent capacity, making them effective in capturing and holding onto liquids and particles. This property is particularly useful in applications where the filter needs to capture and retain moisture or liquids.

  - **Breathability:** Cotton is breathable, allowing air and gases to pass through while still capturing particulate matter. This makes it suitable for applications where both air filtration and breathability are important, such as in respiratory masks.

  - **Non-allergenic:** Cotton is generally non-allergenic and well-tolerated by most individuals. This makes it a suitable material for filters used in applications where contact with sensitive skin or respiratory systems is common, such as in medical masks or air purifiers.

  - **Low Static Charge:** Unlike some synthetic materials, cotton typically generates low static charges. This can be beneficial in applications where static electricity could interfere with the filtration process or pose a safety risk.
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**Synergies between Cotton & Technical Textiles**

**WHY COTTON?**

- Cotton is made of long chains of natural cellulose containing carbon, hydrogen and oxygen otherwise known as polysaccharides. The length of the chains determines the ultimate strength of the fibre.

- An average of 10,000 cellulosic repeat or monomeric units make up the individual cellulose chains which are about 2mm in length. The linear molecules combine into microfibrils and are held together by strong intermolecular forces to form the cotton fibre.

- The unique physical and aesthetic properties of the fibre, combined with its natural generation and biodegradability, are reasons for its universal appeal and popularity.

- Chemical treatments such as Proban9 and Pyrovatex10 are two examples of the type of durable finishes that can be applied to make cotton fire retardant.

- High moisture absorbency, high wet modulus and good handle are some of the more important properties of cotton fibre.
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Way Forward / Conclusion

Branding cotton based on...

- Environmentally conscious company
- Socially responsible
- Caring for the customers
- Value driven
- Verifiable claims

New Thinking...
creating special space
- Special effects/properties
- Uniqueness
- Sustainability
- Social responsibility
- Verifiable claims (tracking)
- Branding

Bring in Innovation
- Novel finishes/effects required to mitigate technological challenges
  - shrink proof, wash/light fast processing
  - coating and laminating:
  - antiviral, antimicrobial
  - water repellent, moisture management
  - Anticrease
- Fashion driven

Bring in Sustainability & Social responsibility
- Removing harmful chemicals
- Using natural materials
- Avoiding social exploitation
- Balancing fashion with sustainability

Quality and Reliability
- International Certification for
  - Sustainable manufacturing
  - Durable functional effects
- Traceable markers to
  - Reduce counterfeiting
  - Building confidence in customer

THANK YOU!