SRINIVASAN COLLEGE OF ARTS AND SCIENCE

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Perambalur- 621212

Topic : Fibres

SUBJECT: FORENSIC PHYSICS AND BALLISTICS.

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Definition of Fibre

Fibre is a thin thread of natural or artificial substance which can be woven or twisted into a fabric which in turn changes into a textile products.

Types of Fibres :

There are two types of Fibres based on their origin

- Natural
- Man – made

Some of the **Natural fibers** are as follows ,

Cotton

Woven or knitted, cotton produces a soft, strong fabric that is breathable, absorbent and washable, and blends well with other fibres. It is now the world's largest non-food cash crop and the most used natural fibre, but cotton only accounts for 24 percent of global fibre use.

Linen

Flax is its source material.Breathable and highly absorbent, linen's natural crispness drapes the fabric away from the body, ensuring cool comfort.it now accounts for less than 1 percent share of the world fibre market. Flax thrives in cooler climates – France is the world's leading producer, followed by Belgium, Belarus and China.

Hemp

Hemp derives from the fibres of the cannabis plant.Hemp has a reputation for being coarse and heavy. However, modern techniques now produce a fibre and yarn that are both soft and strong, that can be knitted and woven. It works well in blends with other fibres. As a crop, hemp

requires little water and usually no chemical fertilisers and pesticides. It grows fast, with high yields, making it an environmentally friendly fibre.

Silk

Renowned for its luxury and fluidity, silk is produced from silkworm cocoons. It can be woven, knitted and dyed, and has thermal and wicking properties, making it good for use in underwear and base layers.Silk accounts for just around 0.1 percent of the global textile market, but has a multi-billion dollar trading value. China is the largest producer, with a highly mechanised operation; India ranks second with a more rural production base.

Some of the **Man – made fibres** are as follows ,

Polyester

Polyester is now the world's most commonly used fibre, overtaking cotton in 2002. Prized for its relative cheapness, strength, lightness and wrinkle-free properties, polyester can be woven, knitted and blended with other fibres.It is made through a chemical reaction involving coal, petroleum, air and water.

Viscose or Rayon

Viscose is mainly derived from wood that is pulped, mixed with caustic soda, processed with carbon disulphide, more caustic soda and finally pushed through a spinneret (like a fine sieve) into a bath of sulphuric acid to create fibres. It dyes easily, Originally marketed as artificial silk and also known as rayon

Cotton

Linen

Hemp

Silk

Polyester

Rayon

Figure Name : Types of Fibres

Chemical composition of Fibres in percentage (%)

The main constituents of the fibers are cellulose, hemicelluloses, lignin, pectin, and wax.

The composition of fibers depends on the geographic location where the plants are grown up

Types of fibre	Cellulose	Hemicellulose	Lignin	Wax and minerals
Flax	64 – 71	18.6 – 20.6	2 - 5	5
Kenaf	44 - 57	22 - 23	15 - 19	2 - 5
Jute	61 - 72	13.6 – 20.4	12 - 13	0.5 - 2
Hemp	70.2 - 77	17.9 – 22.4	3.7 – 5.7	0.8
Ramie	68.6 – 76.2	13.1 – 16.7	0.6 – 0.7	—
Abacca	56 - 63	15 - 17	7 - 10	3
Sisal	67.5 - 78	10 - 24	8 - 11	0.6 - 1
Cabiya	68 - 77	4 - 8	13	1.5 - 2
Bamboo	26 - 43	15 - 26	21 - 31	17 - 5
Esparto	33 - 38	27 - 32	27 - 32	6 - 8

Table Name : composition of Fibres

Properties of Fibres :

Some of the general characteristics of Fibres are as follows ,

- High length to width ratio – A pre-requisite for processing of fibers into yarns and fabrics is that their lengths must be more than widths.
- Tenacity – The strength of textile fibers is referred to as their tenacity. It is determined by measuring the force required to rupture or break the fiber.
- Flexibility – Fibers should be flexible or pliable in order to be made into yarns
- Uniformity – Uniformity of fibers towards its length, ensure production of even yarns
- Cohesiveness – It is the ability of the fiber to stick together properly during yarn manufacturing processes
- Resilience – Resilience is the springing back of recovery of a fiber when it is released from a deformation.

Applications of Fibres :

- Fibers are used in various applications such as building materials, particle boards, insulation boards, human food and animal feed, cosmetics, medicine and for other biopolymers and fine chemicals

- Fibers for polymer composites is growing rapidly to meet diverse end uses in transportation, low cost building, and other construction industries

- Fibers can be employed are: packaging, molded products,sorbents, filters, and in combinations with other materials.

- Structural beams and panels were designed particularly on plant oil-based resins and natural fibers

- Some fibre is used to make several household products like rope and floor covering and also as a stuffing in mattresses and pillows.

- Super-absorbent fibers, in contrast, can retain high quantities of water, which makes them ideal for applications ranging from diapers to self-healing concrete walls.

Case Study for Fibre Evidence

Bhagwat Parbati Kshirsagar vs The State Of Maharashtra on 11 January, 2018

- **Case No :** 3 of 2016
- **IPC Sections :** Sections 201, 302, 363, 376(2) and 377 r/w 34 of Indian Penal Code
- **POCSO Sections :** Sections 3 and 4 of POCSO Act
- **Judgement :** A. M. DHAVALE
- **Date :** 7.1.2017
- **Victim :** Siddhi
- **Convict :** Bhagwat Kshirsagar

Rahul Kshirsagar

- **Witnesses :** 22 witnesses

1 Eyewitness – Gayabai

The unfortunate victim Siddhi was aged four years and three months. She was daughter of P.W.1 Sambhaji, residing at Waranga (Masai), District Hingoli , Maharashtra. Accused no.1 Bhagwat Kshirsagar and accused no.2 Rahul Kshirsagar are neighbours of P.W.1 Sambhaji and their houses are situated in front of house of P.W.1 Sambhaji. On 7.1.2016, at about 12.00 noon, Siddhi returned from her play school. She was playing with her sister Riddhi aged two years in front of her house. Her father's step mother P.W.6 Gayabai was sitting in front of her house. At about 12.30 to 1.00 p.m., accused no.1 Bhagwat and accused no.2 Rahul (appellants) came there and offered to provide chocolates to Siddhi. Siddhi being unaware about evil intention of accused nos.1 and 2, she followed them . They took her along with them to a shop of PW8 Shaikh Bismillah. Thereafter, she did not return. P.W.6 Gayabai started searching for Siddhi. At 3.30 p.m., one Masarao made a phone call and informed to PW1 Sambhaji who was out station for work that Siddhi was missing. PW1 Sambhaji returned home at 4:30 p.m. PW6 Gayabai told him that sometime after 12.00 noon, both the accused had taken away Siddhi towards a shop for providing chocolates and since then she was missing. Then, P.W.1 Sambhaji and his relatives and villagers searched for Siddhi and as she was not found, Sambhaji reached Kalamnuri Police Station at 6.30 p.m. and reported about missing of Siddhi. The police did not record the report but came along with P.W.1 Sambhaji to the village and took both the accused to the Police Station. Then Police Inspector with other staff came to the village for taking search. They inspected one house at 9.45 p.m., which is claimed to be of accused no. 3-Parbati (father of accused no.1-Bhagwat). They found Siddhi in dead condition kept in one white bag of fertilizer with gagging of her mouth by stuffing of raw cotton in her mouth. There were blood stains on

her clothes and there were injuries on her vagina and anus showing bleeding. Then dead body along with white bag was taken to Kalamnuri. The police recorded F.I.R. of P.W.1 Sambhaji at 4.16 a.m. on 8.1.2016. It was mainly against accused no.1-Bhagwat and it was alleged that accused no.2 Rahul had assisted accused no.1 Bhagwat in committing rape and murder of Siddhi. On the basis of F.I.R. in above terms, the Crime at C.R.No.9/2016 under Sections 201, 302, 363, 376(2) and 377 r/w 34 of Indian Penal Code and under Sections 3 and 4 of POCSO Act came to be registered . The parents of accused no.1 Bhagwat (accused no. 3-Parbati & accused no.5-Panchafula) and parents of accused no.2 Rahul (accused no.4-Baban and accused no.7-Shobha) and brother of accused no.1 Bhagwat by name Kavinarayan were also prosecuted for causing disappearance of evidence of murder by concealing the dead body in bag of fertilizer inside the house of accused no.3 Parbati

During the investigation, the police officers arranged to get the post mortem conducted. The sample of raw cotton found in the room and chocolate wrapper were seized. The accused were arrested. Their medical examination was carried out. Their nail clippings and blood samples were also taken. Their nail clippings containing cotton fibres along with cotton taken out from the mouth of siddhi by medical officer were sent for analysis. Their clothes were seized. The birth certificates of the appellants and deceased siddhi and other documentary evidence was collected. The seized articles were sent to chemical analyst

Nail clippings of both the accused showed fibers of cotton, which was found similar to the sample of cotton seized from the mouth of Siddhi and raw cotton found in the room

Accused nos. 1 & 2 were convicted for kidnapping a girl, aged four years for the purpose of subjecting her to illicit intercourse, for committing gang rape and for committing unnatural intercourse and thereafter committing her murder by gagging her mouth by stuffing raw cotton and for causing disappearance of evidence all acts committed in furtherance of common intention of them

Punishment :

OFFENCE	SENTENCE		
	Substantive	Fine	In default
363, 34 IPC	7 years	Rs. 500/-	R.I. 3 months
366, 34 IPC	10 years	Rs. 500/-	R.I. 3 months
376(2)(I) r/w 34 IPC.	RI for life	Rs. 1000/-	R.I. 6 months
377, 34 IPC	R.I. for life	Rs. 1000/-	R.I. 6 months
302, 34 IPC	Sentenced to death		
201/34 IPC	7 years	Rs. 500/-	R.I. 6 months

The End