



# SERVICEABILITY

# SERVICEABILITY

- Serviceability of a fabric is its length of life up to its end of usefulness which occurs when it becomes deficient in one necessary property. A garment is considered to be serviceable when it is fit for its particular end use.
- The particular factors that reduce the service life of a garment are heavily dependent on its end use

# **FACTORS AFFECTING SERVICEABILITY**

- Changes in fashion
- Shrinkage or other dimensional changes
- Changes in the surface appearance of fabric like pills or surface fuzz, snags etc.
- Fading of the color through light or washing. The bleeding of the color from one area to another.

# FACTORS AFFECTING SERVICEABILITY

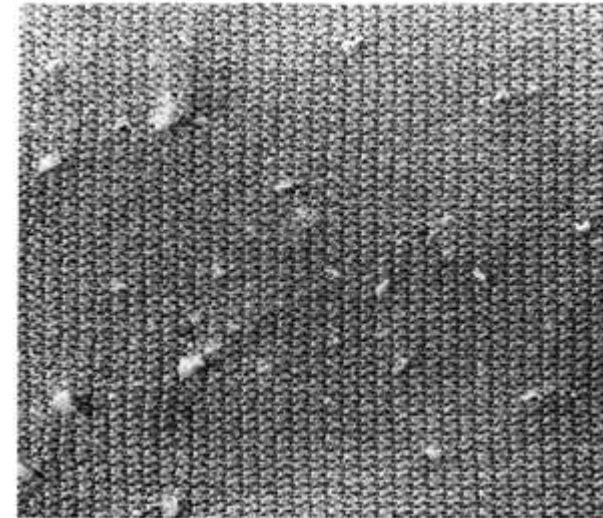
- Failure of the seams of the garment by breaking of the sewing threads or by seam slippage.
- Wearing of the fabric into holes . Wearing of the edges of cuffs, collars and other folded edges to give a frayed appearance.
- Tearing of the fabric by being snagged by a sharp object.

# SNAGGING

- A snag is a loop of fiber that is pulled from a fabric when it is in contact with a rough object.
- Snag detracts the appearances of the fabric but do not reduce any of other properties.

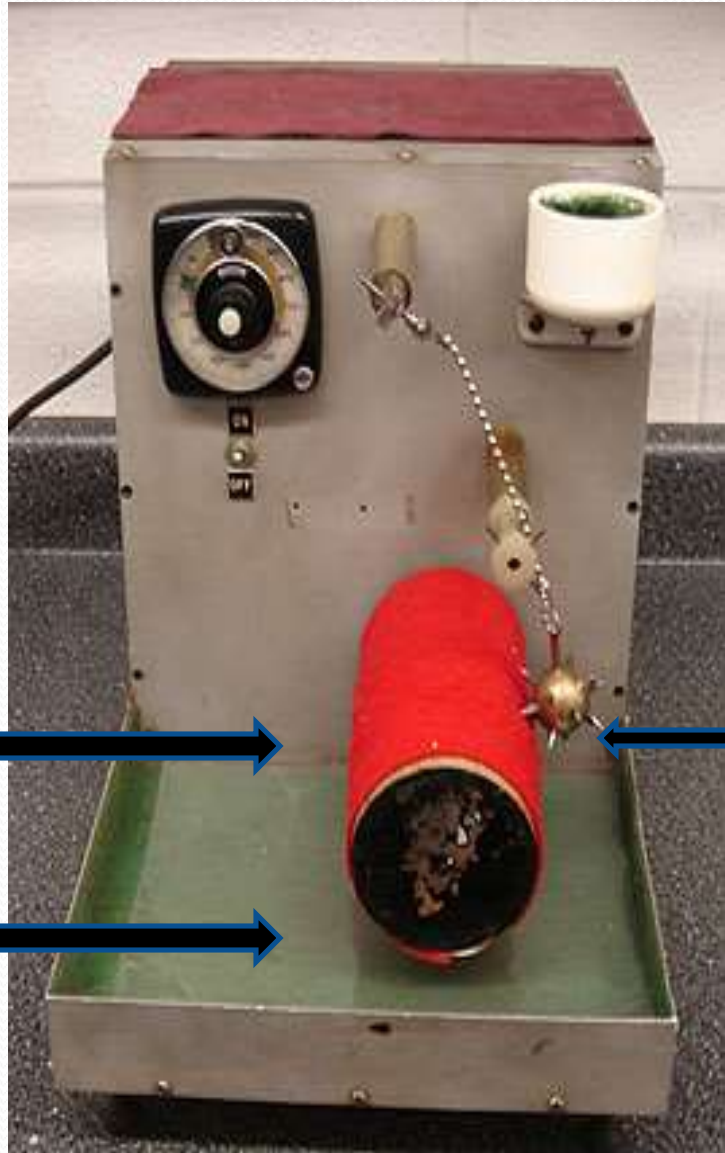
*Snags can be classified into three types*

1. Snags that have a protrusion and no distortion,
2. Snags that have distortion and no protrusion,
3. Snags that have both protrusion and distortion.



# MACE SNAGGING TEST

- The mace snagging test is a comparative test of the snagging propensity of different fabrics.
- It rapidly determines the tendency of fabrics to snag in normal wear.
- Provided with 4 rotating cylinders fitted with sleeves of felt and test fabric, mace balls and controlled by a predetermined electronic counter. Meets ASTM D-3939 Standard



**FABRIC  
SAMPLE**



**ROLLER**



**MACE**





# PILLING

- Pilling is a condition that arises in wear due to the formation of little pills of entangled fiber clinging to the fabric surface giving it an unsightly appearance





# RANDOM TUMBLE PILLING TESTER

**Scope:** Determines the resistance to the formation of pills and other related surface changes of textile fabrics

## **PROCEDURE**

- Samples are laundered 3 times and then conditioned in atmospheric conditions for textiles
- The samples each 150 mm squares are cut on the bias are sealed with glue and allowed to dry
- The 3 samples are placed in the pilling chamber along with 25mg of gray-dyed cotton fiber and tumbled for 30 minutes
- The samples are evaluated in a viewing apparatus against photographic standards (ASTM ADJD 3512) or in house fabric standards



Atlas Random Tumble Pilling Tester

# PILLING TEST SWISS STANDARD

- This test uses the standard Martindale abrasion tester which is fitted with large specimen holders and also has the driving pegs fitted at a smaller radius in order to give a reduced specimen movement
- The specimen is rubbed against a sample of same fabric at low pressure and then assessed for pilling in the normal way.
- Different pressures are used depending on the type of fabric being tested.

# MARTINDALE TESTER

- Samples are laundered 3 times and then conditioned in atmospheric conditions for textiles
- Sample is mounted in the bottom table as well as in the specimen holder
- The machine is run for 100 cycles and evaluated
- It may be run up to 1000 cycles with 100 cycle evaluation intervals
- The samples are evaluated in a viewing apparatus against photographic standards (ASTM ADJD 3512) or in house fabric standards
- Specimen holder pressure is 3kPa



Martindale Abrasion Tester



# ICI PILLING BOX OR HEALS BOX

- Four specimen each of 125mm x 125mm are cut from fabric
- All the four specimens are then placed in the pilling box
- They are then tumbled together in cork lined box .
- The no of revolutions used in the test is 18000 which takes about 5 hrs.
- The no of revolutions vary with the fabric samples.

# HEALS BOX TESTER



# METHOD OF ASSESSMENT

- Abrade the sample until a predetermined end point such as a hole and record the time or number of cycles to this.
- Abrade for the set time or number of cycles and assess some aspect of the abraded fabric which as change in appearance loss of mass loss of strength change in thickness or other relevant property.

# ABRASION RESISTANCE

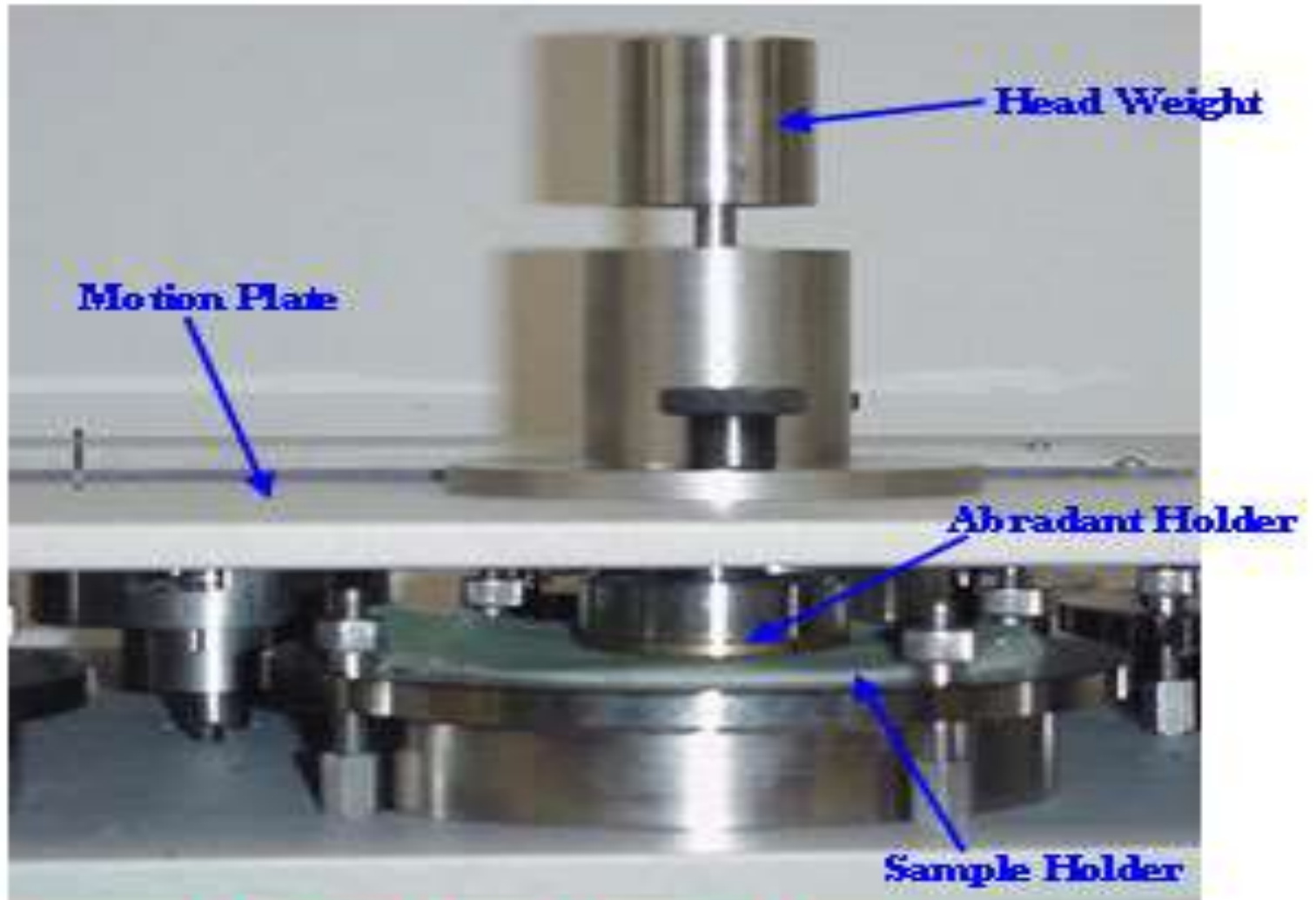
- The property of a material to withstand mechanical action such as rubbing, scraping, or erosion, that tends progressively to remove material from its surface. Such an ability helps to maintain the material's original appearance and structure.

# MARTINDALE

- This apparatus is designed to give a controlled amount of abrasion between fabric surfaces at comparatively low pressures in continuously changing directions.
- The fabric under test is abraded against a standard fabric. Resistance to abrasion is estimated visually.



- **Method** – Four specimens each 38mm in diameter are cut .
- They are then mounted in the specimen holders with a circle of standard foam behind the fabric being tested.
- The test specimen holders are mounted on the machine with the fabric under test next to the abradant.
- A spindle is inserted through the top plate and the correct weight.
- **Assessment** – The specimen is examined at suitable intervals without removing it from its holder to see whether two threads are broken. The abrading is continued until two heads are broken. All four specimens should be judged individually.



**Figure 1: Description of Martindale Abrasion Tester**

# FACTORS AFFECTING ABRASION RESISTANCE

- **Fiber type** ( nylon – high abrasion resistance and viscose and acetates – low abrasion resistance)
- **Fiber properties**
  - Longer fibers have better abrasion resistance as they are harder to remove from the yarn
  - Increased fiber diameter improves abrasion resistance up to a certain limit.
- **Yarn Twist-** low twist more abrasion
- **Fabric structure** – more threads per cm , less force each individual thread has to bear . However the threads gets jammed together and thus absorb distortion

# FACTORS AFFECTING ABRASION TEST

- **Type of abrasion** – This may be plane, flex or edge abrasion or a combination of more than one of these factors.
- **Type of abradant** – A number of different abradants have been used in abrasion test including standard fabrics steel plates and abrasive paper of stones (aluminum oxide or silicon carbide).
- **Pressure** – The pressure between the abradant and the sample affects the severity and rate at which abrasion occurs.
- **Speed** – Increased speed brings the dangers of accelerated testing. A rise in temperature of the sample can occur with high rubbing speeds; thus can affect the physical properties of thermoplastic fibers.

# FACTORS AFFECTING ABRASION TEST

- **Tension** – It is important that the tension of the mounted specimen is reproducible as this determines the degree of mobility of the sample under the appointed abradant.
- **Direction of abrasion** – In many fabrics the abrasion resistance in the warp direction differs from that of the weft direction Ideally the rubbing motion used by an abrasion machine should be such as to eliminate directional effects.



# ADVANTAGES OF LABORATORY TEST

- They are rapid
- Designed to give objective result which helps in ranking of fabrics
- The test is under direct control of the tester which helps in maintaining exact conditions required for test
- They can be reproduced.

# DISADVANTAGES OF LABORATORY TEST

- Laboratory tests can only imitate wear conditions
- Expensive equipment is necessary
- Laboratory test can lead to faulty result if one tries to speed up the process

# REFERENCES

- Saville. B.P(1999) Physical testing of textiles by Woodhead publishing limited, Cambridge England,( Page no – 184-207)
  - Vatsala . R (2003) textbook of Textiles and Clothing , Indian Council of Agricultural Research , New Delhi , page no (14 – 20)
- UGC NET home science  
By CBH cosmos bookhive publishing ltd
- <http://www.google.co.in/search?hl=en&site=img&tbm=isch&source=hp&biw=1024&bih=485&q=types+of+yarns&oq=types+of+yarns&gs>



**THANK YOU**