SHOE INDUSTRY CERTIFICATE COURSE

UNIDO

PATTERN CUTTING *

The complete Certificate Course includes the following learning elements:

Certificate course

-Feet and last
-Basic design
-Pattern cutting
-Upper clicking
-Closing
-Making
-Textiles and synthetic materials
-Elastomers and plastomers
-Purchasing and storing
-Quality determination and control
-Elements of physics
-General management
-Production management
-Industrial Law
-Industrial accountancy
-Electricity and applied mechanics
-Economics
-SI metric system of measurement
-Marketing
-Mathematics
-Elements of chemistry

FOOTWEAR TECHNOLOGY

PATTERN CUTTING

Alexander L. Snastin
UNIDO Expert

PATTERN   CUTTING

Programme :   1.   Definition of pattern cutting

2.   Object of pattern cutting

3.   Formes: definition
                     objectives

4.   Methods of forme cutting

5.   Standard Construction

6.   Cutting Parts ; outside linings

Pattern Cutting - is the foundation of all subsequent shoe making operations.
          It is essential therefore all patterns should be 100% accurate. Any
          inaccuracies at this stage can cause problems in all departments of the
          factory.

Objective :   To provide accurate patterns to a given style to correctly fit a
              range of lasts.

Range of Lasts :   2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, etc.

Formes - a flat representation of the top surface area of the last.

Objective :   To produce a shape identical to the top of surface of the last.

Sequence of Operation:

2 dimension   3D   2D   3D

form   last   standard   pullover

Methods of Forme cutting: 1.   Paper
                                 2.   Tape
                                 3.   Fabric
                                 4.   Vacuum forming

Details to be observed :

    1.   allowances
    2.   outside seams (underlays making allowance)
    3.   adequate fitting marks
    4.   correct allowance for edge treatment
    5.   accuracy and neatness in cutting and entering of details

Difference between Oxford and Derby :

    The vamp of the derby is on top of the quarter; while in oxford it is under the quarter.

Procedures of Pattern/Cutting for 3/4 Quarter Court Shoe:

1.   Cover the lasts (use canvass method)
2.   Draw center lines (front and back)
3.   Find the vamp point
4.   Back height (size 4 = 52 mm $\pm$ 2mm between sizes)
5.   Measure joint girth measurements mark 1/6 as vampline
6.   Join the joints back height and 1/6 at vamp oint.
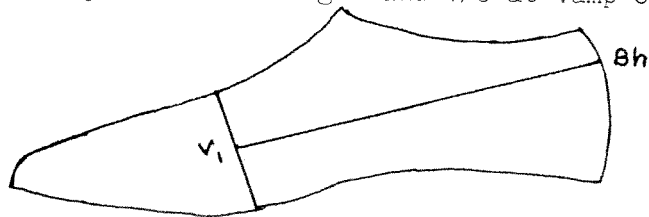
7.   Cut along center lines (obtain inside & outside formes)
8.   Remove the inside and outside and stick to a paper
9.   construct a mean forme
10. construct the standard

    -    draw a straight line - place the vamp point and toe point on the line. Mark around the forme

    -    transfer design. Add 12mm lasting allowance

11. Cut it out. Mark all details like size, last no., name of the design and allowances.

12. Cut parts for 3/4 cut court shoe.

Procedures:

    1.   Cover the last
    2.   Obtain inside and outside formes
    3.   Construct mean forme
    4.   Construct standard forme
    5.   Cut parts

Size	BH	
9	62	288
8	60	278
7	58	271
6	56	262
5	54	254
4	52	
3	50	

1. XY   YZ   = base line

2. YP = 30 or 20mm

3. Trace inside and outside forme

4. JP = 5/7 of the foot length see (PJ TABLE)

5. XJV = $\angle$ 65°

6. JI - 1/3 of JP

7. IK parallel to JV

8. KP = long heel line

9. PH = 5 - 10° from point P depending on the last used

10. $\angle$ PKH = 75°

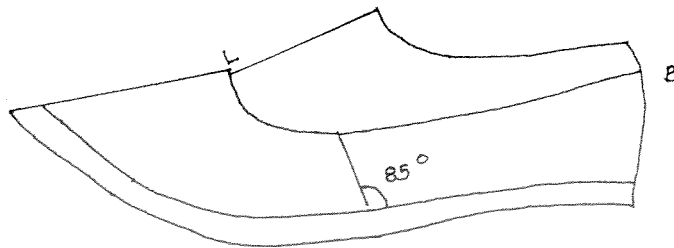11. V, K, J, I, = 10mm

Standard Construction for Ladies Court Shoe :

1. Construct standard for ladies court shoe
2. Cut a) whole cut
       b) 3/4 cut
       c) half cut parts
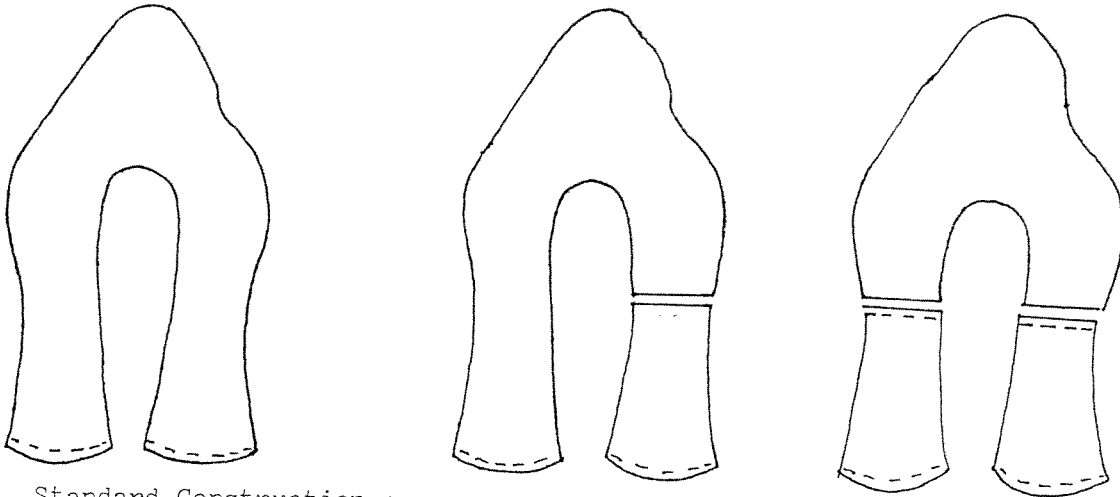
Standard Construction :

1. Draw a straight line
2. Place mean forme - vamp point and toe point
3. Add 12mm lasting allowance
4. 3/4 cut - measure distance from point "V" to point "B" divide by 4 and measure 3/4 from B.


Court Shoe with   a) toe cap
                  b) vamp
                  c) quarter
                  d) counter
                  e) collar

Procedure for Derby Style :

1. Draw two base lines XY-YZ

2. YP = heel height = 30 mm

3. Trace inside forme by placing seat point on "P" and forepart along
    XY base line.

4. Trace outside forme by placing seat point on "P" and the high toe point
    with inside forme toe point

5. PJ = 5/7 of foot length

6. XJV =∡ 65 on XY base line

7. JI = 1/3 of JP = 60 mm from point J

8. IK parallel to JV --- instep line

9. KP = long heel line

10. ∡ KPH = 5°

11. V, K, J, I, = 10 mm

12. Draw a straight line from V_1V and toe

13. Construct parallel line from V_1 to VJ

14. Draw a curve line thru points MCI_1

15. Draw underlay of 8 mm from point M C I_1

16. Extend JV_1 line of 20 mm and mark point N

17. Join V_1 H

18. to obtain the top line join from point "H" through long heel line to BH

19. add 12 mm lasting allowance to inside and outside formes

20. reduce top back line by 2 mm and add 3 mm to the seat line on point P

DERBY STYLE

CAP   VAMP   FACING   QUARTER   COUNTER

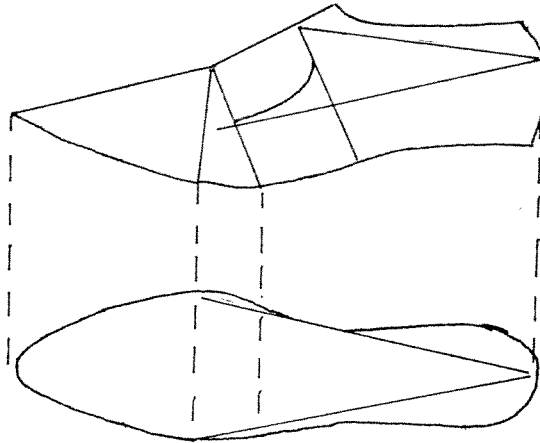Oxford
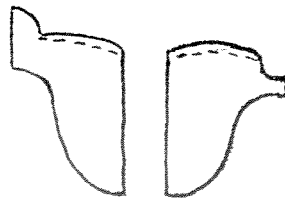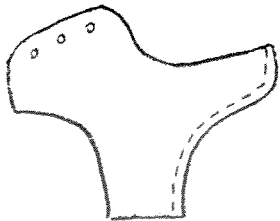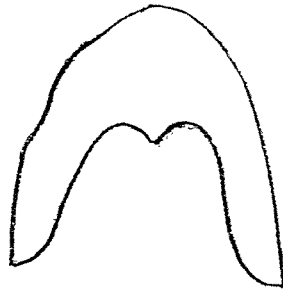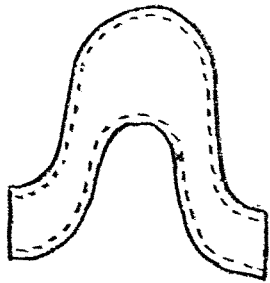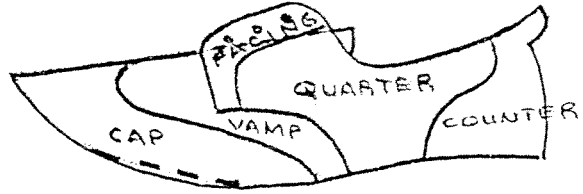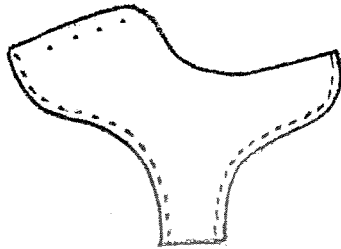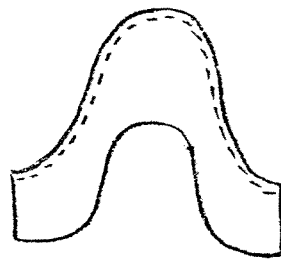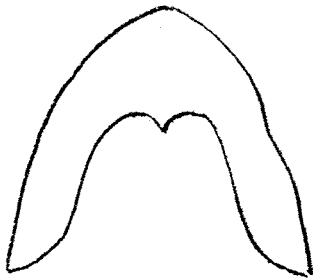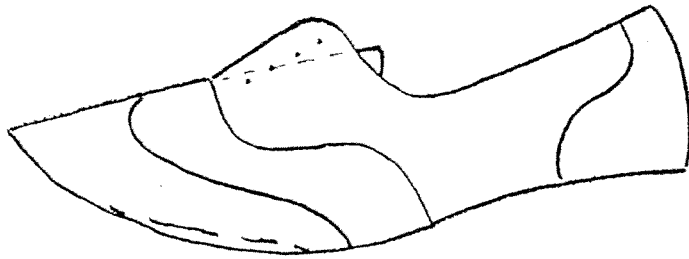
Precision Designing :

How the main points of the upper design are fixed on the last.

1. Back Height   -   it is $\frac{1}{4}$ of the girth measurement of the instep.

2. Height of the quarter

   a) $\frac{1}{2}$ of the standard insole length for the size of last concerned

   b) measure the length in a straight line from the top of the back height of the last to a point where the given length meet with the center line on the comb.

3. Flex free area

   a) the idea is to determine on area on the forepart of the last which is free of flexion

   b) Tab points and oxford throat have to be placed within that area to avoid gaping of quarter

   c) measure in a straight line 2/3 of the standard insole length from the center of the heel towards inside and outside feather edge

   d)   measure 1/9 of standard insole length. Measure this distance behind the two previous points and this gives the Near limit.

4. If you want to design derby style - 1/6 of the joint girth measurement
                              oxford   - 1/7 of the joint girth measurement
                              casual   - 1/6 of the joint girth measurement

Procedure for Men's Casual with Saddle :
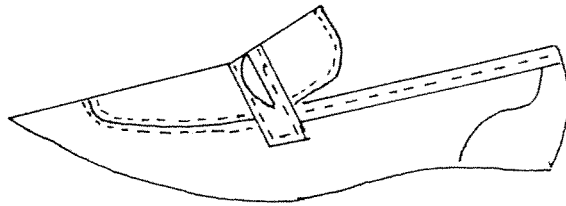
1. Draw a straight line

2. Trace the inside forme along the straight line. Do the same with the outside forme.

3. AB = 112 mm

4. BI = 35 mm

5. IC = 30 mm

6. BC, draw a

7. Draw a straight line from point I to X_1

8. Bisect IX, and mark X

9. Mark back height TS - 60 mm

10. Connect points TX will give top line

11. Draw a 10 mm-collar top line

12. Design a saddle

13. Design counter 20 mm Top line
                     76 mm Bottom line

14. AA_1 = 30 mm join to point X

15. Add 12 mm   lasting allowance

16. Measure 16 mm from the bottom line X draw parallel to xx, collar

17. Connect points C to X use curve line

18. Adjust top and back by 2 mm at top. Add 3 mm at bottom

Procedures for Men's Monk Style :
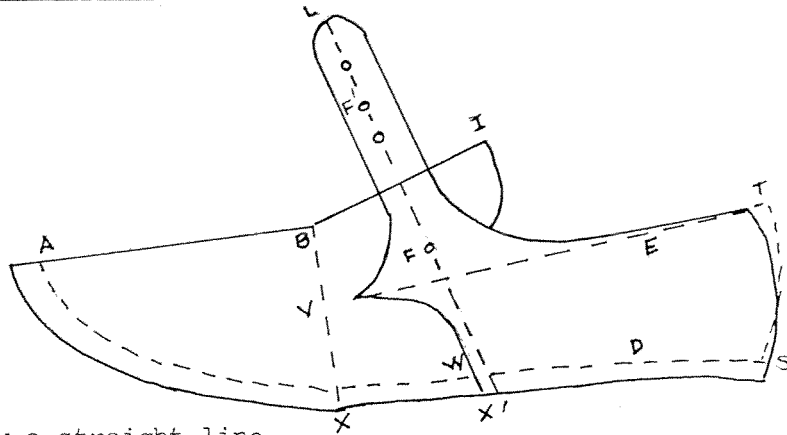
1. Draw a straight line

2. Trace inside and outside formes to obtain mean forme

3. A B = 112 mm for size 8 $\pm$ 2 mm between sizes

4. BI = $\frac{1}{4}$ standard length (SL) + 10 mm = 80 mm

5. BX $\perp$ AB or $\angle$ ABB X = 90°

6. BV = 2/5 of BX = 34 mm

7. Bisect BI to find H point mark centre of the strap

8. Draw a line HX, at 90% to B 7

9. Draw a straight line at the $\angle$ 84, mark 75 mm from point H
    (HL = 75 mm)

10. Make width of the bar 22 mm

11. F_1 and F_2 are 30 mm from H with 10 mm between holes and F_2
    being the buckle position

12. Back height = 60 mm

    ST = 60 mm joint points V & T with straight line that
    will represent topline.

13. Tab point of quarter is 10 mm from V on line VT

Procedure for Men's Grecian Slipper :

1. AB = 120 mm
2. BI = 40 mm
3. BX = $90°$ to AB
4. BV = 40 from B
5. W = 15 mm from X_1
6. Lasting allowance 15 mm

Lining : B_1 = 16 mm from B

Trisect BX = C

Draw vamp line for B_1 through "C" to "W"

Seam position - where the quarters join vamp CC_1 = C_1W
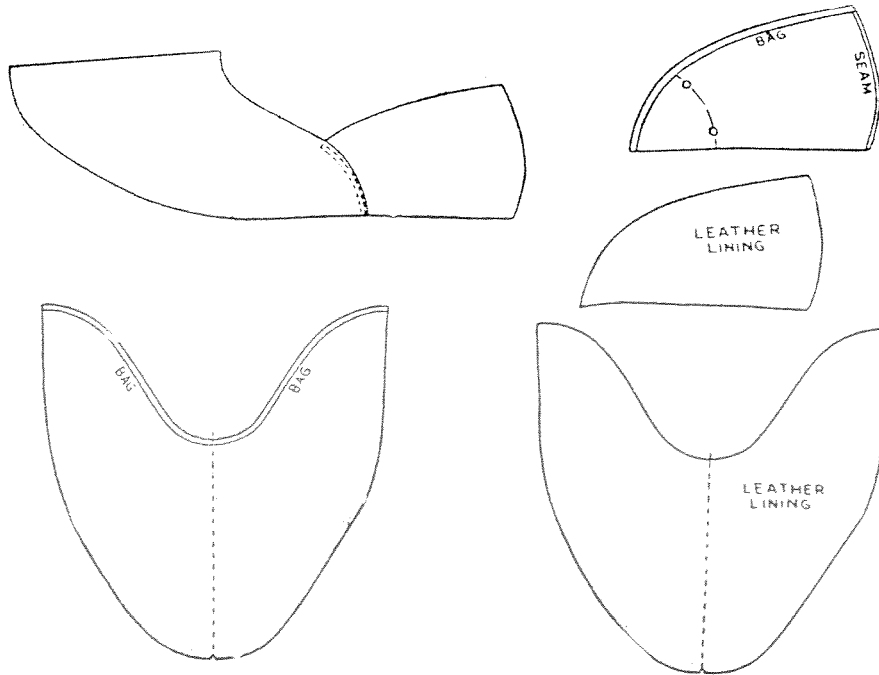
Procedure for Children Ankle Strap Shoe :

1. AB = 75 mm for size 2   1 mm between sizes
2. X = 90° to AB
3. X = 1/3 fo BX
4. V_1 = 5 mm from V
5. C = 46 mm for size 2   1mm between sizes
6. Connect V_1 to point C
7. Make distance of 46 mm between galosh & bottom strap
8. Add 10 mm to the width of the bar
9. Make bar length half standard length of the last
10. Make CC_1 = 25 mm
11. Widen the end of the strap to 12 mm
12. Add 12 mm lasting allowance
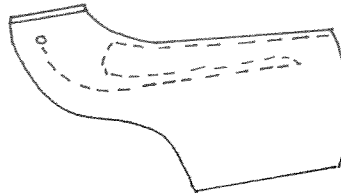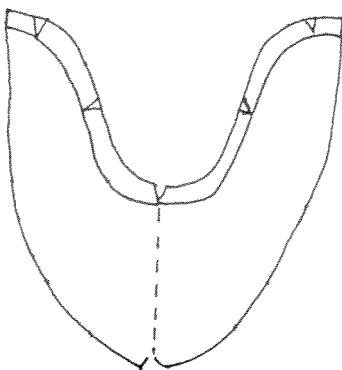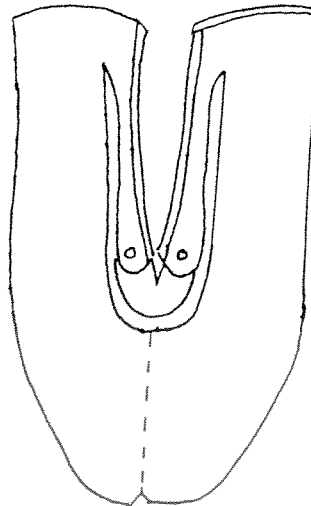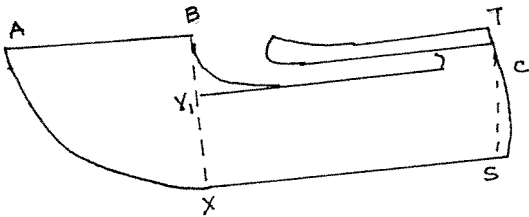
PRocedure for Children's Veldtschoen Sandal :

1.   AB = 75 mm for size 2

2.   X = 90° to AB

3.   V = 1/3 of BX from B

4. V_1 = 10 mm from V

5.   I = ¼ standard length of the last

6. I_1 = 10 mm from I, I, W parallel to BX

7.   F = 6 mm from I center of bar

8.   FL = 85° to FI

9. F_1 = 45 mm from F with 8 mm between holes

10. Make T bar 4 mm wide at I and 8 mm at B

11. TS = 46 mm for size 2 - 2 mm between sizes

12. Lasting allowances = 11 mm

13. Flanged out 8 mm from S
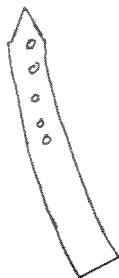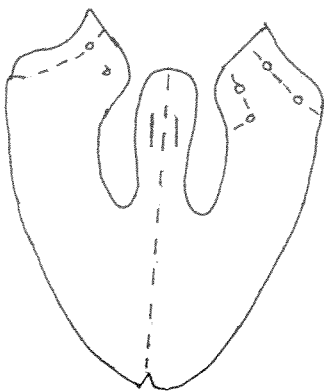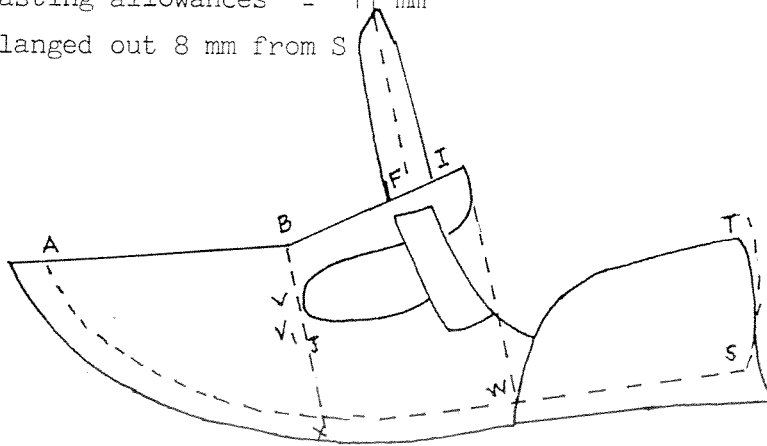
Procedure for Men's Ankle Boot :
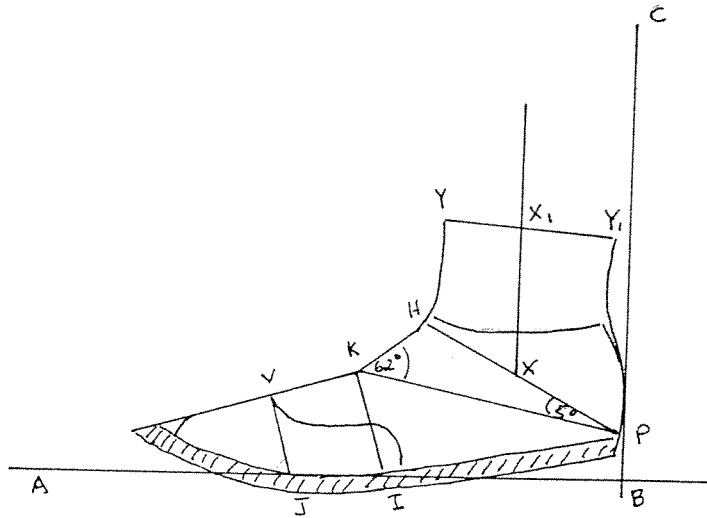
1.   Draw a base lines AB - BC
2.   Mark Heel heights "BP"
3.   Trace the inside form
4.   Trace the outside form (consider points "P" & points on toe)
5.   Pitch line is 5/7 of the foot length
6.   JV - (vamp point) $<$ 65° from AJV
7.   JI = 1/3 of JP
8.   IK parallel to JV
9.   KP = long heel line
10.   Short heel line = $\angle$ KPH = 10°
11. $\angle$ PKH = 62° = point "H"
12.   HX $\equiv$ XP
13.   Draw a parallel line to "BC" baseline and mark the length XH = X_1
14. $Y X_1$ = 1/3 of HP
15.   X, X_1 Y_1 = 85° Y,X, X = 95°
16.   Draw a straight line from V points to toe point
17.   Add lasting allowance (15 mm)

Construct Standard for Moccasin Style :

1. Cover top part   -   apron
2. Cover bottom and side of the last
3. Design moccasin style
4. Cut top   -   apron
5. Cut vamp part
6. Add stitch allowances to apron & vamp
7. Mark perforations on apron and vamp

Procedure :

1. Draw center lines   (front - back)
2. Design apron
3. Design sides
4. Cut apron   -   stick on to paper
5. Pull out upper stick on the paper
6. Add 14 mm to the front of apron
7. Mark line on the original line and then 11 mm from original
8. Mark holes 10 mm apart starting from the center both sides
9. Mark the same amount of holes on the apron

Geometric Method of Ladies High Boot Standard :

1. AB & BC = base lines

2. BP = pitch line or heel height

3. Place and draw around inside forme

4. Place outside forme and draw around

5. Pitch line = 5/7 S I (PJ) = 170 mm

6. JV = AJV = 60°

7. Instep line JI = 1/3 of JP parallel to JV

8. KP (long heel line)   KPH ladies = 5°; mens = 10°

9. PH = short heel line   KPH Ladies = 5°; mens = 10°

10.   HRP = 72°

11. HL = LP = LN parallel to BC base line

12. N_1 = N_2 is 1/3 of PH from N

13. Calf is 72% of the total

14. Draw a straight line from point V through toe point.
     Add 15 mm lasting allowance.

15. At point P - 6ss 3 mm or thickness of the stiffener.

SCALE	SECOND					WASTE %						
	3	4	5	6	7	8	10	12	15	20	25	30
0.050	22.2	21.7	21.5	21.3	21.2	21.1	21.0	20.9	20.8	20.7	20.7	20.7
0.075	23.0	22.4	22.0	21.8	21.6	21.4	21.2	21.1	21.0	20.9	20.8	20.7
0.100	23.8	23.0	22.5	22.2	21.9	21.7	21.5	21.3	21.2	21.0	20.9	20.8
0.125	24.7	23.6	23.0	22.6	22.3	22.1	21.7	21.5	21.3	21.1	21.0	20.9
0.150	25.5	24.2	23.5	23.0	22.7	22.4	22.0	21.7	21.5	21.3	21.1	21.0
0.200	27.2	25.5	24.5	23.8	23.4	23.0	22.5	22.2	21.9	21.5	21.3	21.2
0.250	28.8	26.7	25.5	24.7	24.1	23.6	23.0	22.6	22.2	21.8	21.5	21.3
0.300	30.5	28.0	26.5	25.5	24.8	24.2	23.5	23.0	22.5	22.0	21.7	21.5
0.350	32.2	29.3	27.5	26.3	25.5	24.9	24.0	23.4	22.8	22.2	21.9	21.7
0.400	33.8	30.5	28.5	27.2	26.2	25.5	24.5	23.9	23.2	22.5	22.1	21.9
0.450	35.5	31.7	29.5	28.0	26.9	26.1	25.0	24.3	23.5	22.7	22.3	22.0
0.500	37.2	33.0	30.5	28.8	27.6	26.8	25.5	24.7	23.8	23.0	22.5	22.2
0.550	38.8	34.2	31.5	29.7	28.4	27.5	26.0	25.1	24.2	23.2	22.7	22.5
0.600	42.0	35.5	32.5	30.5	29.1	28.0	26.5	25.5	24.5	23.5	22.9	22.5
0.650	45.3	36.7	33.5	31.3	29.8	28.6	27.0	25.9	24.8	23.7	23.1	22.7
0.700	48.7	38.0	34.5	32.2	30.5	29.2	27.5	26.3	25.2	24.0	23.3	22.8
0.750	52.0	39.5	35.5	33.0	31.2	29.9	28.0	26.7	25.5	24.2	23.5	23.0
0.800	55.3	42.0	36.5	33.8	31.9	30.5	28.5	27.2	25.8	24.5	23.7	23.2
0.850		44.5	37.5	34.7	32.6	31.1	29.0	27.5	26.2	24.7	23.9	23.3
0.900		47.0	38.5	35.5	33.4	31.7	29.5	28.0	26.5	25.0	24.1	23.5
0.950		49.5	40.0	36.3	34.1	32.4	30.0	28.4	26.8	25.2	24.3	23.7
1.000		52.0	42.0	37.2	34.8	33.0	30.5	28.8	27.2	25.5	24.5	23.8
1.250			52.0	43.8	38.4	36.1	33.0	30.9	28.8	26.7	25.5	24.7
1.500				52.0	44.9	39.5	35.5	33.0	30.5	28.0	26.5	25.5
2.000						52.0	42.0	37.2	33.8	30.5	28.5	27.2

EXAMPLE OF TABLE OF LEATHER % ADDITIONS

TYPES OF LEATHERS	BLACK	BROWN	COLOURS
OUTSIDE LEATHERS			
Patent and Cellulosed Leather	-	-	-
Calf	1	2	3
Veals	1	2	3
Printed and Grain Sides	-	-	-
Smooth Sides	1	2	3
Grained Goats	1	1	1
Glace Kid	3	4	4
Suede Calf	5	5	5
Suede Kid	5	5	5
Suede Sheep	10	10	10
Suede Splits	5	5	5
Rounded Butts and Square Shoulders	-5	-5	
LINING LEATHERS			
E1 Calf	-	-	-
E1 Kips	1	1	1
Goats	2	2	2
Sheep	5	5	5

GRADE	PROPORTION AND UNUSABLE LEATHER TO TOTAL AREA	AVERAGE WASTE	% ADDITION
1	Up to 2½%	-	Normal
2	Over 2½% & up to 7½%	5%	5%
3	Over 7½% & up to 12½%	10%	11%
4	Over 12½% & up to 17½%	15%	18
5	Over 17½% & up to 22½%	20%	25
6	Over 22½%		determined by experiment for each leather