Chapter 4

The Mass-Production Process: the apparel industry at work
Apparel Production Cycle (服裝製作 生產週期 3-6 months) figure 4-1; p.68

1. Evaluation of previous line and trend analysis
2. Design
3. Sourcing, including costing
4. Preproduction
5. Production
6. Distribution
7. Sales
Evaluation of the previous line and trend analysis

• Development plan is based on
  – evaluation of last season’s sales figures, market research and trend identification, analysis of customer, and comparison of competitors’ product

• Fashion trends in terms of silhouette, style, color, and detail

• Way to research trend information
  – Travel to place
  – In-house merchandisers or consult fashion forecasters and color services
  – Industry professional trade publications, Women’s Wear Daily (WWD) and Daily New Record (DNR)
(二) Design

1. Line/collection development –
   • A series of related designs of color story or concept
   • Computer-aided design (CAD) systems aid the design and manufacturing processes

2. Preliminary line approval

3. Fabric and findings research and development (right fabric and findings for the styles they plan to produce)
(二) Design

4. Making of first patterns –
   - patternmakers convert 轉變 these designs 設計圖 into first patterns 紙型
   - Patternmaker then making the necessary changes based on the sloper or basic block (Figure 5-5, p. 105)

5. Construction 建設製作 of Prototype garments
   - The experimental garment made from the first patterns
   - From sample room or prototype lab, not mass production
Using CAD -CAD advantages

- Eliminate time-consuming sketching
- Allow the designer to use, recombine, or change elements (size, shape, color) of garments
- Scan actual garments or pictures of garments into memory
- Scan existing fabric swatches into memory
- Apply colors and prints to garment designs on screen
- Communicate design to other locations easily
- Preview line on-screen
- Provide digital images for desktop or advertisement
- Require prototype garments to be produced only if the design chosen for production
(三) Sourcing (contracting)

- Manufacturers must reserve the necessary quantities of raw materials and decide who will cut and sew the garments at this stage in the production cycle.

- Outsourcing (searching and finding for contractors and fabric suppliers specialize in certain products of processes).

- Determining the production capacity availability, lead time, and negotiated cost with manufacturers.
(三) Sourcing - Costing

- Estimating and determining the total cost of producing a garment, including materials, labor, transportation, and expenses of operating the business

- Two type of cost
  - Precosting
  - Costing
Precosting & costing

- Precosting – developed and distributed to prospective contractor  
  often with prototype garment and garment specification (樣本&服裝指引書)
- Production costing – manufacturers calculated costs (計算成本) with great accuracy because they produced similar styles every years
Costing sheet

- Used for production costing (figure 4-6; p. 78)
  - Including:
    1. Fabric (60-70% of total cost)
    2. Findings (thread, trims-ribbon and lace; closure-buttons and zippers; labels- care, brand and size; miscellaneous materials – elastic and shoulder pads)
    3. Labor – spreading, cutting, sewing, pressing, finishing, and any wet-processing operations
    4. Overhead 經常門 (beyond the direct cost of producing garment); ex. New equipment and technology, taxes, insurance, salaries,
    5. Others (packaging material, advertising labels, contracted operations)
Relationship of cost to price

- Accurate costing helps in knowing the wholesale price of garments, then estimate of retailer price

- Balancing cost and quality
  - Profit: reducing material costs; reducing labor costs
  - Maintain of quality
(四) Preproduction 前期製作

1. Fabric testing and approval
2. Garment specifications
   - include diagrams and instructions regarding stitch types, seam types, placement of buttons and pockets, and every other important detail to assure proper construction of the garment.
(四) Preproduction

3. Color or shade or print approval
   - Lab dips (dyed color samples)
   - Shade bands (long, narrow swatches of a fabric cut from different dye lots)

4. Findings testing and approval

5. Care label and other label approval (Ch.2)

6. Making preproduction garments
   - (trial units from every new style are made using actual production techniques in manufacturing plant.

7. Customs / 海關 pre-classification 事先分類 (imports only; quota)
8. **Making production patterns** 製作大量生產用紙型: reduce raw material waste and streamline 效率化 designs without destroying their essence

- Or call hard patterns for optimum fabric utilization and ease of assembly and determines how each garment can be most economically mass produced

- Any unnecessary curves, fullness, seams, or details are eliminated to produce an efficient production pattern
9. **Grading** 縮放版

- Involves increasing and decreasing its dimensions to reflect the various sizes to be produced
- Grade rules: may be even or different amounts of change between sizes
- Graded nest: consists of all the sized of graded patterns
- Many companies have CAD/CAM (computer-aided manufacturing); some still used manually grade their patterns
10. **Marker making** 排馬克

- Marker – arranged on the fabric to achieve the most efficient layout
- Saving inch of fabric will effect on company profits
- Goal is “tight” marker” - large pieces are generally placed first and then small pieces
- Overlapping can be in 1/8” or less
- CAM and computerized market making
  - Allows marker makers to see the entire marker
  - Keeps track of the % of material utilization
  - Positions pieces as closely together as possible
  - Automatically overlaps pieces
  - Auto tilts pieces a programmable
  - Color-codes pattern pieces according to size
  - Arranges pieces as stripes and plaid matches
  - Auto superimposes the straight edges of side-by-side pieces
  - Enlarges hard-to-see areas
  - Stores markers for later use without space
  - Makes duplicate markers quickly and low cost
  - Transmits markers electronically easily
Matching plaids requires additional yardage.

Even plaids contain a balanced arrangement.

Uneven plaid, yet more fabric is needed.

Place on the dominant vertical bar down the center front and center back.

Pockets, pocket flaps, and yokes cut on the bias to minimize plaid-matching costs (figure 4-12; p. 88).

Large Motifs – should not place over the bust or buttocks.
(五) Production 製作生產

1. Spreading 擴產, 排布
2. Cutting the fabric 剪布
3. Making sample garments 樣本
4. Apply decorative details if applicable 細部
5. Sewing production garments 縫製大量生産服飾
6. Wet processing if applicable 水洗
7. Pressing 整燙
8. Finishing and inspecting 完整和檢查
(1) Spreading
- The action of laying multiple plies of cloth on a table before cloth is cut
- Save time and reduce costs
- Directional fabrics include
  - napped fabrics such as velvet, velveteen, and corduroy,
  - Pile fabrics such as fake fur
  - One-way design- such as floral or teddy bear prints
- Directional fabric is spread with each ply of the fabric face up
  - call “nap-one-way” (NOW) or directional
(2) Cutting

- Affects the quality of the finished garment before assemble ever begins
- Cutting affects not just one but many garments simultaneously
- Vacuum tables use suction to compress and stabilize multiple plies of fabric and hold them in place (figure 4-14)
- Straight knife / round knives
- Computer-guided laser beams or high-pressure water jet; but can’t many plies at a time
• (3) Making Sample Garments
  – First garments made in the production process
  – Sample garments are made in the company’s sample size
• (4) Applying decorative detail
  – ex. Embroidery are applied to garment panels before the garment is assembled
  – Screen printing on T-shirts may be applied on completed garments
• (5) Sewing production Garments
  – Parts (portions of collars, cuffs, or pockets)
  – Panels (major garment sections; front and back)
  – Pieces (semi-complete section, sleeve, collars)
  – Product (the completes assembly)
Major Production methods

• Progressive bundle system
  – Produce garments on an assembly line
  – Each operator completes the same task on each garment in the bundle

• Unit production system
  – Send garments to each operator’s station via computer-controlled overhead transporters (figure 1-2; p.3)
  – Improve the flow of garments through the factory and eliminate the time spent in handling bundles
  – Operators cross-train for several jobs so they can work where they are needed most

• Modular manufacturing
  – Group operators into teams, or modules. The team works on one garment at a time instead of a bundle of garments
(6) Wet Processing 水洗過程
– Adds a finish to the assembled garments
– Garments are prewash, they are essentially preshrunk already
– Four basic purposes –
  • garment softening, 柔軟
  • color removal: 移除顏色 most used in jeans
    – (bleaching, stonewashing and frosting)
  • color addition: 增加顏色
    – garment dyeing : on white cloth called prepared for dye; basic apparel as casual shirts, T-shirt, turtleneck
    – Over-dyeing : dyeing one color over another; blended fabric cotton/polyester accepts the color differently
  • wrinkle prevention 防皺: involve applying chemicals to the cloth and baking the cloth in a curing oven
(7) Pressing: well presses garments make a good impression on consumers and command a higher price than unpressed or poorly pressed garment

- Finished pressing / off pressing using industrial steam iron
- Special form presses (also call Paris presses) are shaped like the garment. Most used in corduroy, velveteen, and tailored garments
- Upright presses – use hangers to hold the garment in position, steam is blown into the garment
(8) Finishing and final inspecting

- Adding finishing details (buttons, labels, snaps),
- trimming and inspecting (each garment is inspected and long threads are trimmed),
- repairing or reworking any defects,
- pressing,
- folding and packing
- Final audit: with the garments totally prepared for shipping, in-plant auditors perform a final audit;
  - using randomly sampling to determine the Acceptable quality level has been made
(六) Distribution

- Air freight: most expensive
- Vessel (boat): most common used in global shipments; show vessel or fast vessel
- A shipping consolidator make arrangements
- Brokers clear paperwork and imported product through customs
Sales to consumers

- Sales data using POS (point of sales) terminals and relayed back to manufacturers
- Different retail distribution
- Apparel manufacturers gather for the Apparel trade show such as Bobbin show