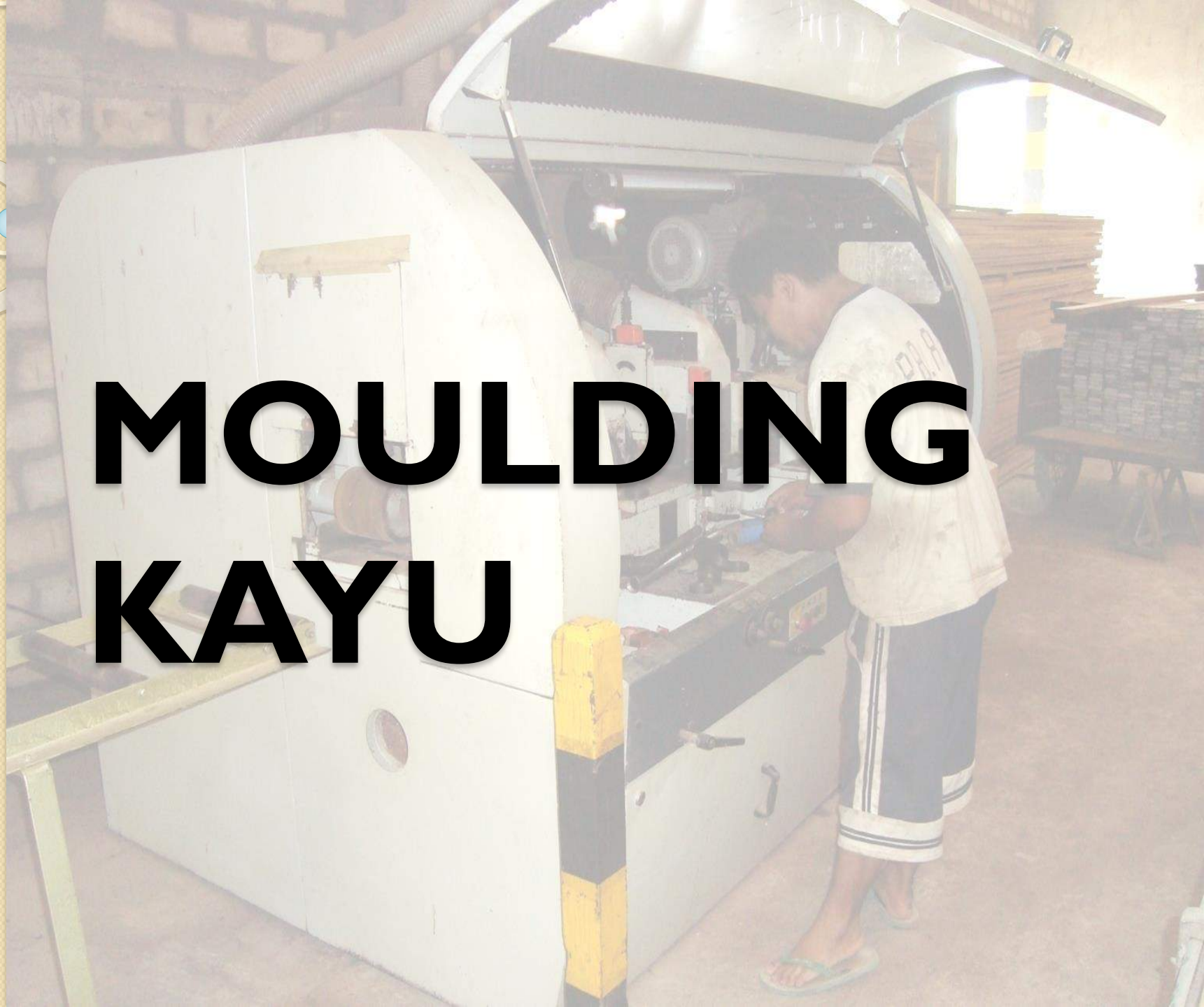
Industri Pengolahan Kayu

Module 4

Pembuatan Moulding Kayu

Rindayatno, S.Hut, M.P



MOULDING KAYU

I. DEFINISI

MOULDING

Berasal dari kata ***Mould*** (bahasa inggris), berarti acuan atau cetakan (kata benda): membentuk atau mencetak barang atau produk dengan cara menuang adonan (mis.: Semen, gipsum dll) ke dalam cetakan.

Hasil cetakan disebut ***Mouldings***.

Kayu dapat menjadi bentuk *Mouldings* dengan dibentuk menggunakan beberapa operasi pengolahan :

1. Penggergajian
2. Pengeringan
3. Pemesinan kayu (wood machining)

   Dalam proses pemesinan kayu, untuk merubah kayu menjadi bentuk mouldings digunakan mesin ***Moulder*** dan prosesnya disebut ***Moulding***.

Dari beberapa definisi tentang *mouldings* dapat disimpulkan bahwa :

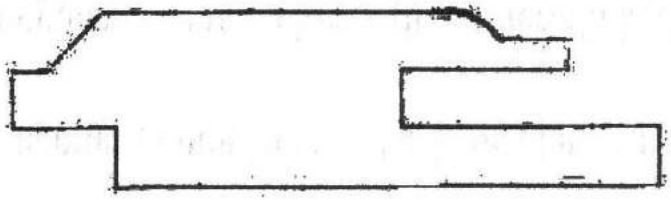
1. *Mouldings* umumnya digunakan untuk hiasan
2. *Mouldings* dapat pula digunakan untuk bangunan struktural dan non struktural
3. Rancangan Standar Nasional Indonesia (RSNI) menetapkan kadar air maksimum 16%

4. Rancangan Standar Nasional Indonesia (RSNI) menetapkan kadar air maksimum 16%
5. *Moulding* mempunyai variasi yang sangat banyak (lebih dari 100 macam).

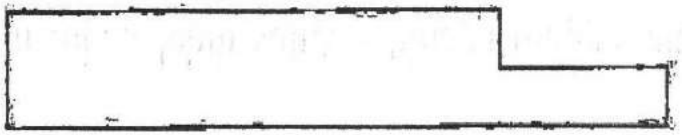
Bentuk-bentuk dasar *mouldings* menurut:

1. Michael Weinig

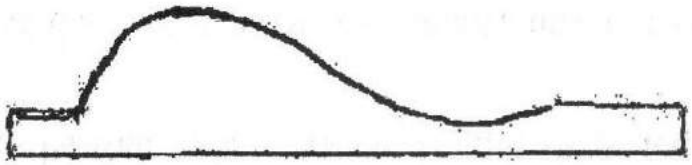
a. Tounge dan groove :



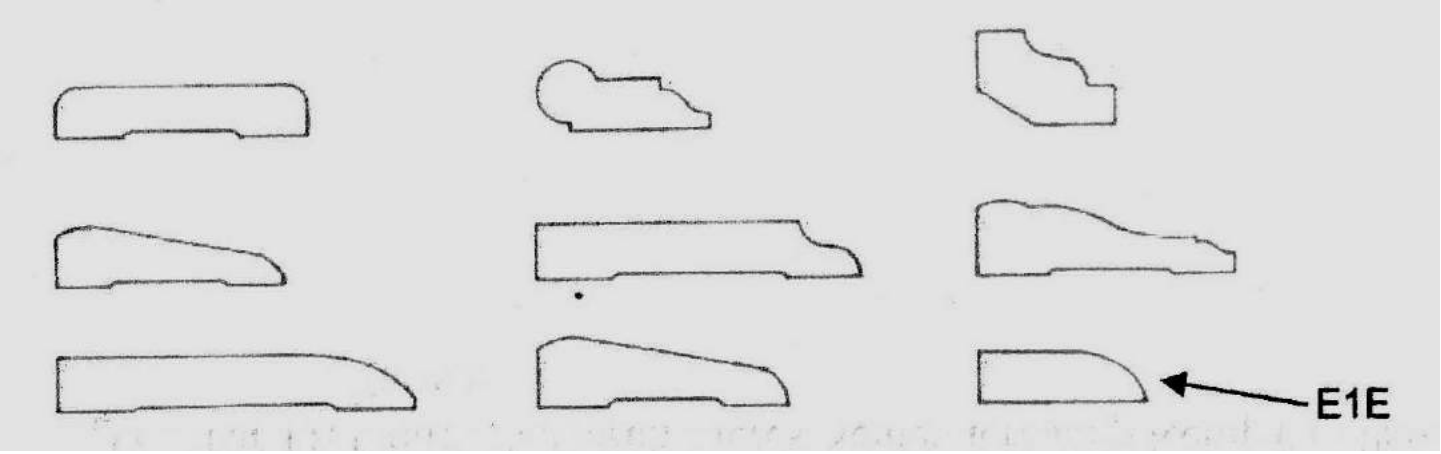
b. Rebate :



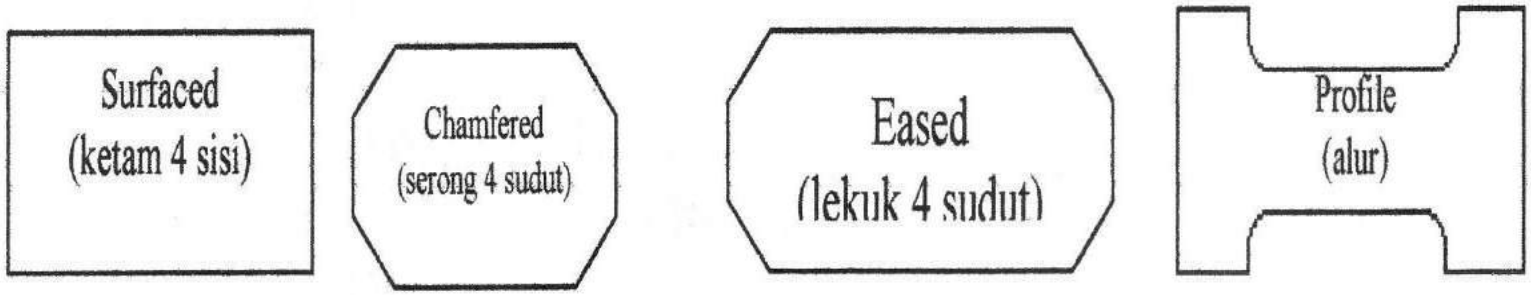
c. Countour :



2. Peter Koch (1964)



3. Untung Riadi (1989)



2. FUNGSI

Beberapa fungsi *mouldings* :

1. ***Furniture Stock* (alat rumah tangga)**

a. *Picture frame* (bingkai foto)

b. *Drawer side/drawer back*

c. *Wooden chair components & bed components*

2. ***Carpentry stock* (building materials)**

a. *Door jamb*

b. *Window frame*

c. *Door components (door rail, door stile)*

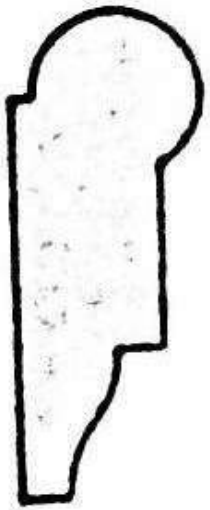
d. *Wall components*

e. *Casing*

f. *Stairs components/hand rail*

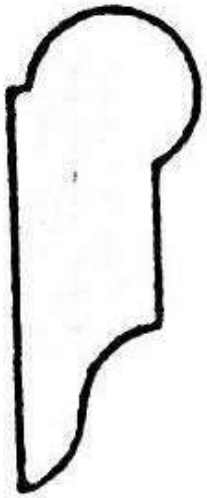
PICTURE FRAME

PICTURE MOULDINGS



WM 273

$\frac{11}{16} \times 1\frac{3}{4}$

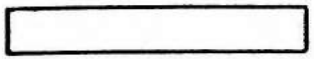


WM 276

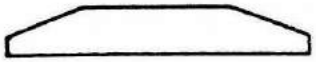
$\frac{11}{16} \times 1\frac{3}{4}$

PANEL STRIPS
MULLION CASINGS

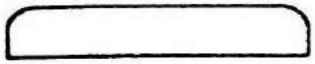
WM 955 3/8 X 2 1/4
WM 956 3/8 X 2
WM 957 3/8 X 1 3/4



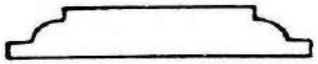
WM 960 3/8 X 2 1/4
WM 962 3/8 X 2
WM 963 3/8 X 1 3/4



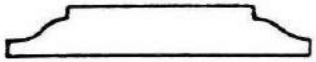
WM 965 3/8 X 2 1/4
WM 967 3/8 X 2
WM 968 3/8 X 1 3/4



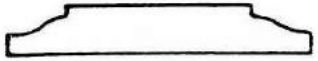
WM 970 3/8 X 2 1/4
WM 972 3/8 X 2
WM 973 3/8 X 1 3/4



WM 975 3/8 X 2 1/4
WM 977 3/8 X 2
WM 978 3/8 X 1 3/4



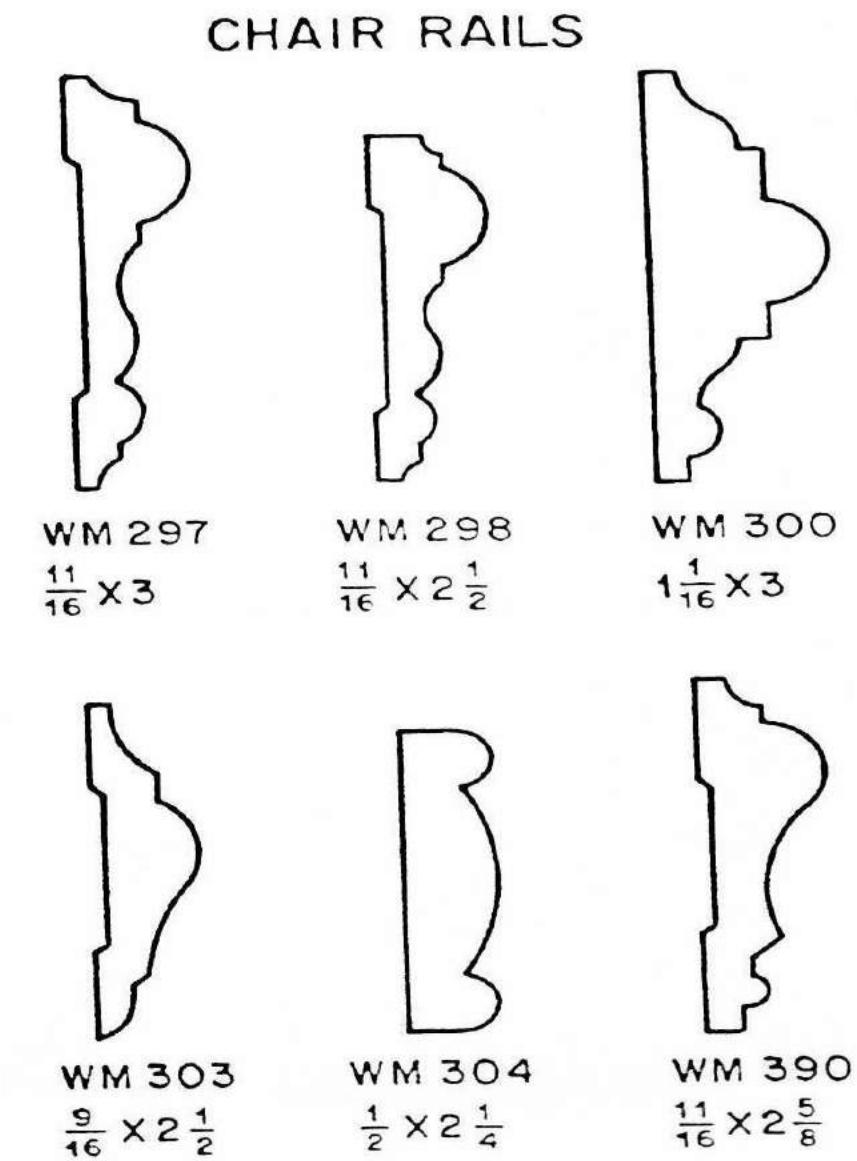
WM 980 3/8 X 2 1/4
WM 982 3/8 X 2
WM 983 3/8 X 1 3/4



WM 985 3/8 X 2 1/4
WM 987 3/8 X 2
WM 988 3/8 X 1 3/4

DRAWER SIDE

WOODEN CHAIR



WALL COMPONENTS

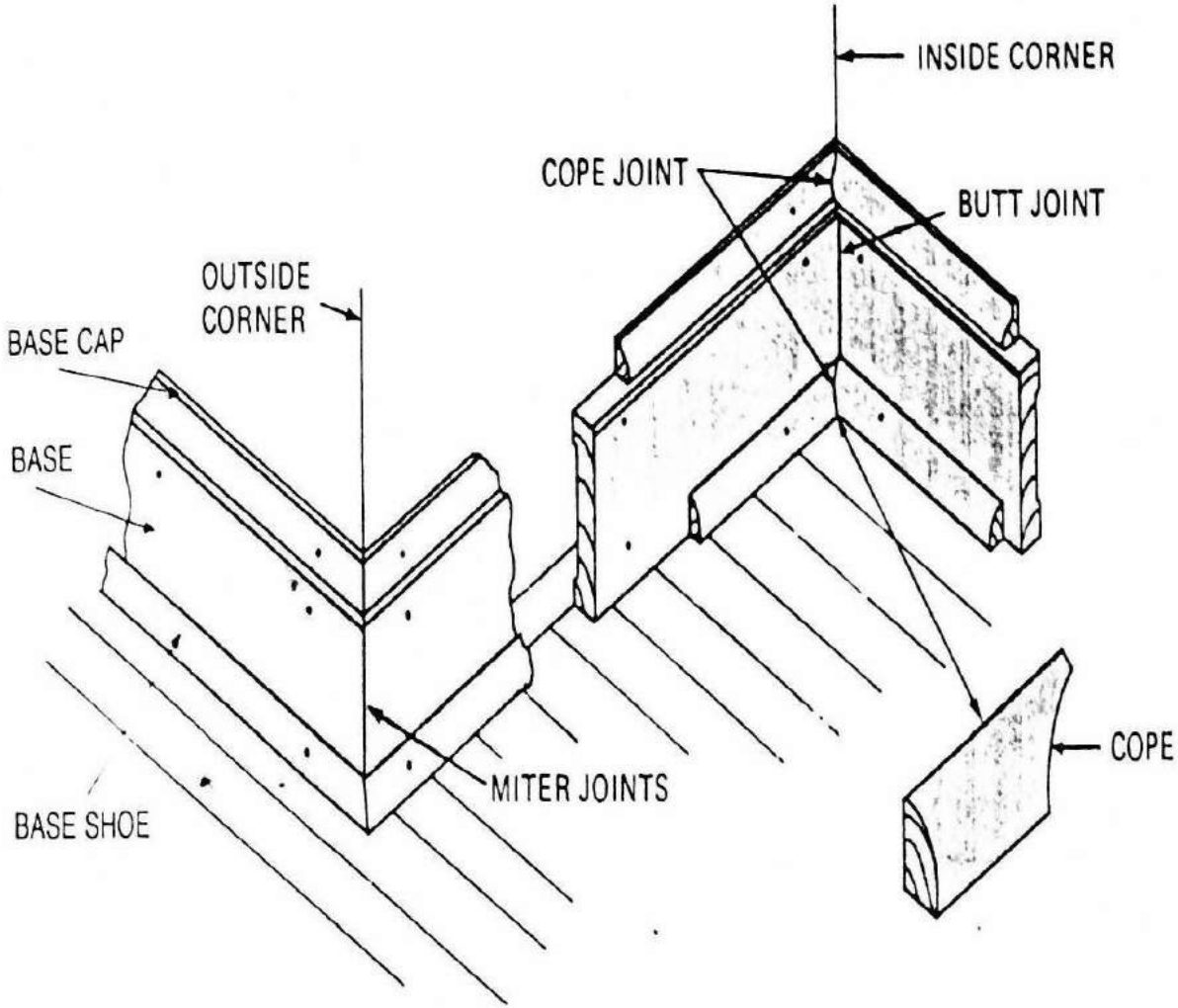


Fig. 78-4 Base, base shoe, and base cap are used to trim the bottom of the wall.

WINDOW AND DOOR COMPONENTS

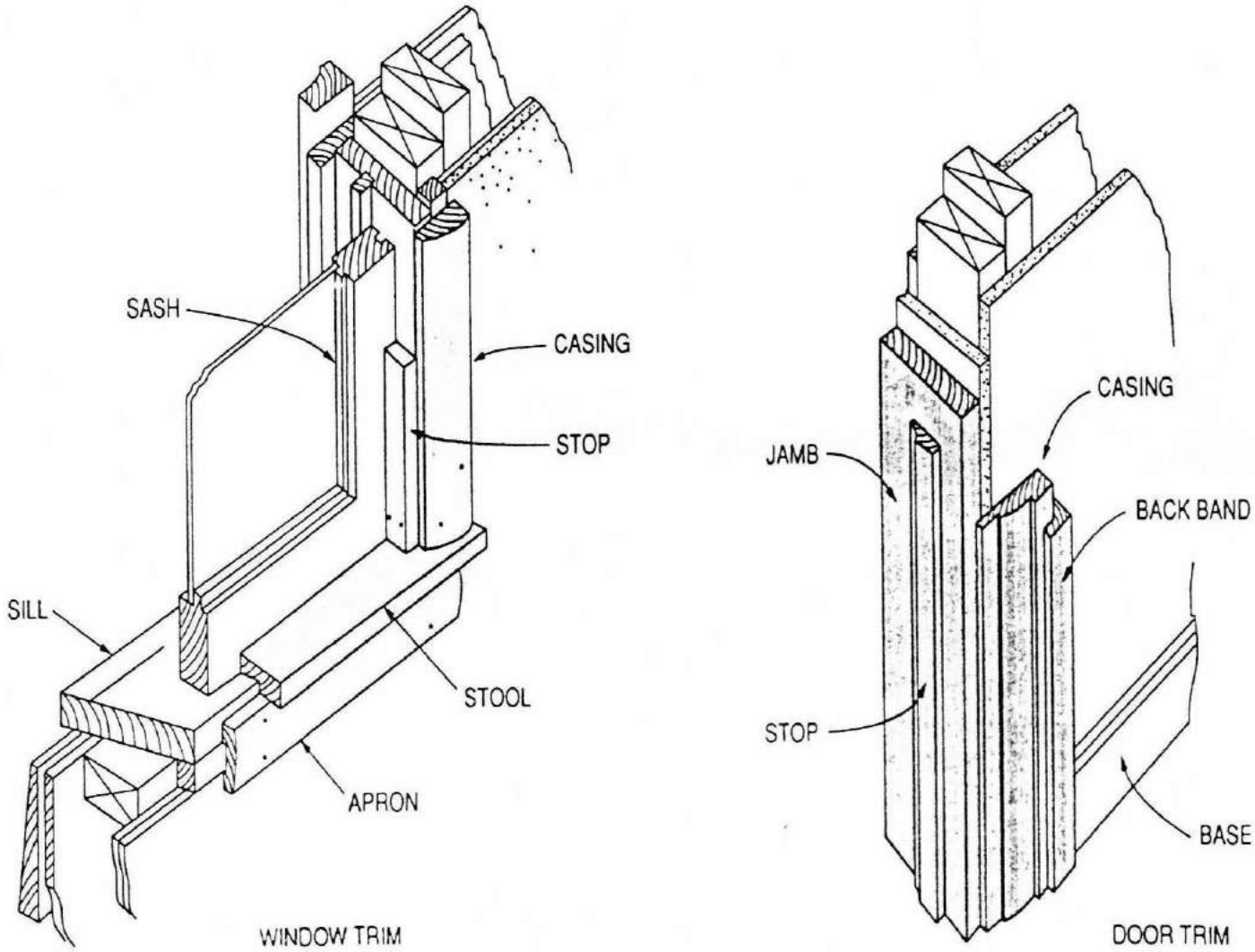
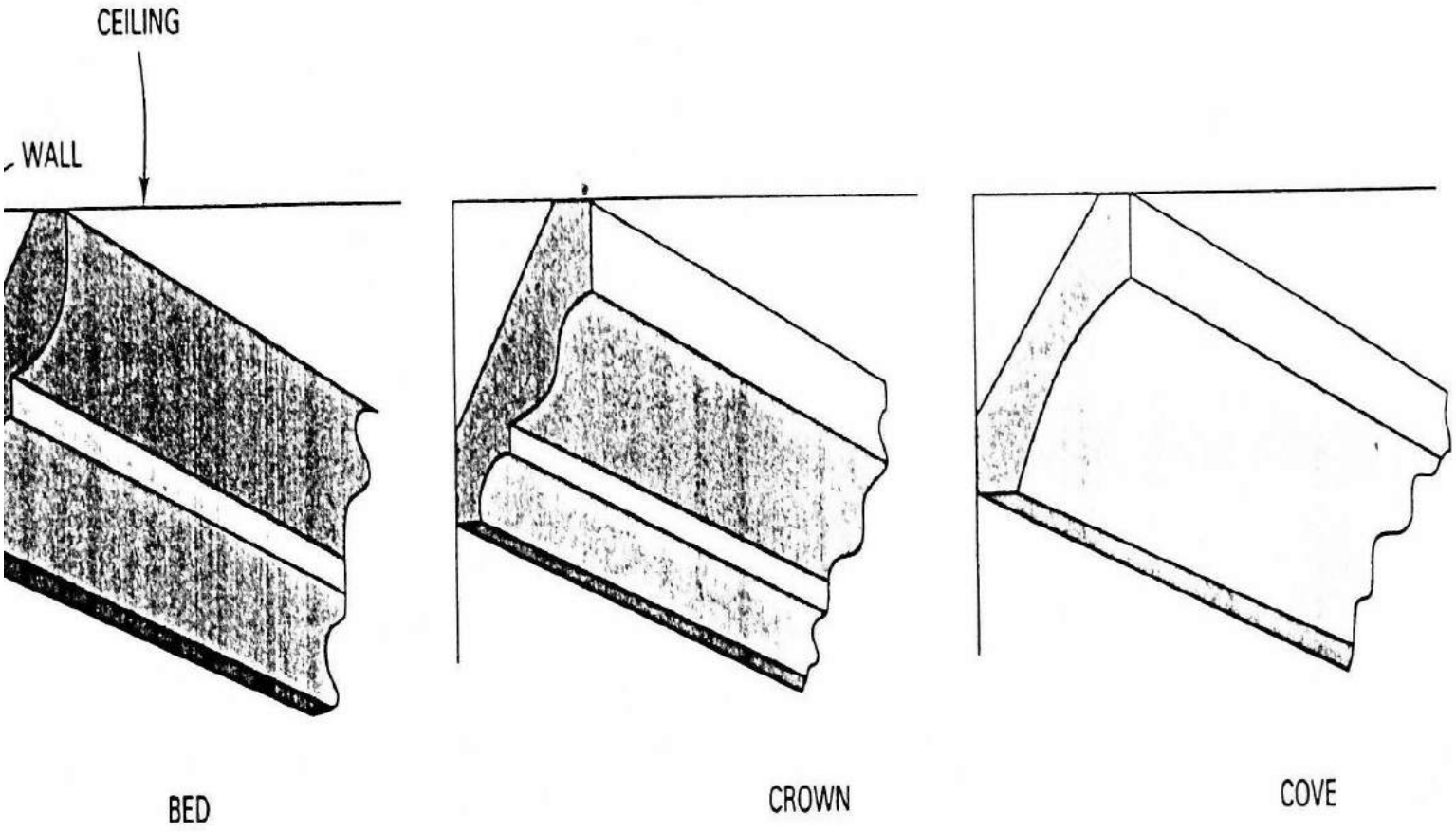


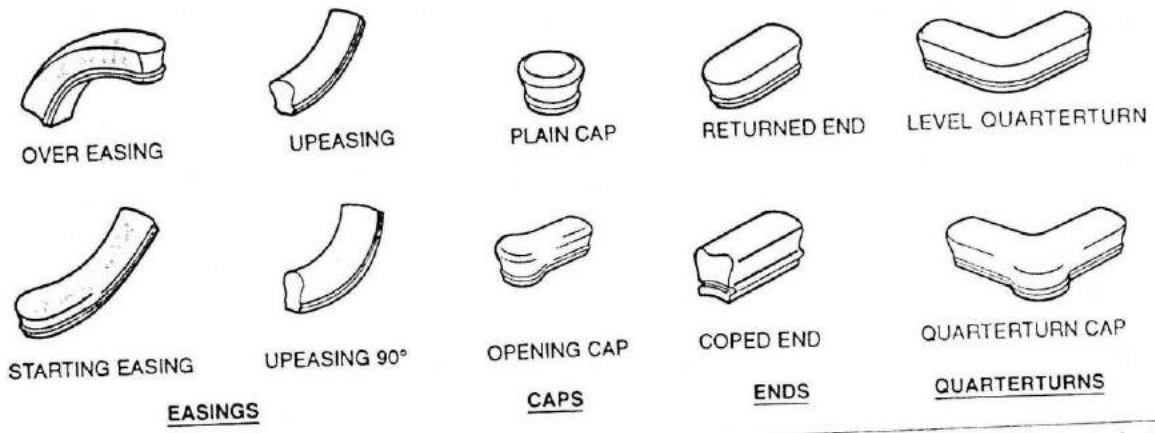
Fig. 78-5 Casing, back bands, and stops are used for window and door trim. Stools and aprons are part of window trim.

WALL COMPONENTS

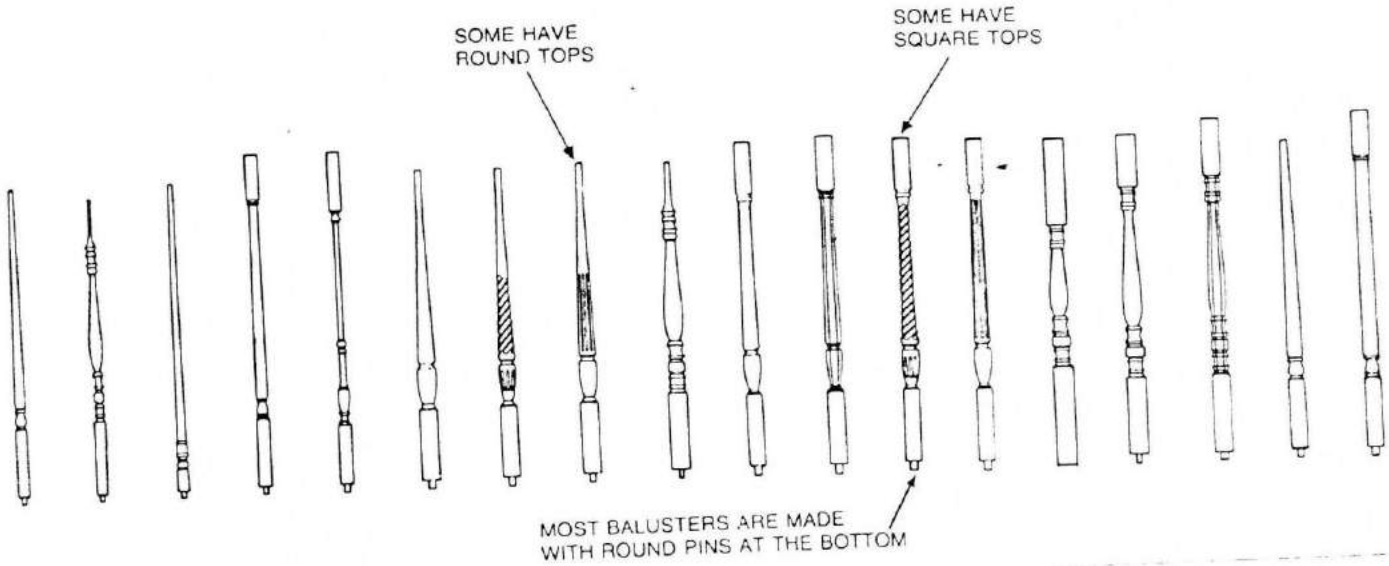


78-2 Bed, crown, and cove moldings are often used at the intersection of walls and ceilings.

STAIRS COMPONENTS/HAND RAIL



g. 80-16 Many miscellaneous fittings are available to meet the need of any type of handrail installation. (*Courtesy of L. J. Smith*)



STAIRS COMPONENTS/HAND RAIL

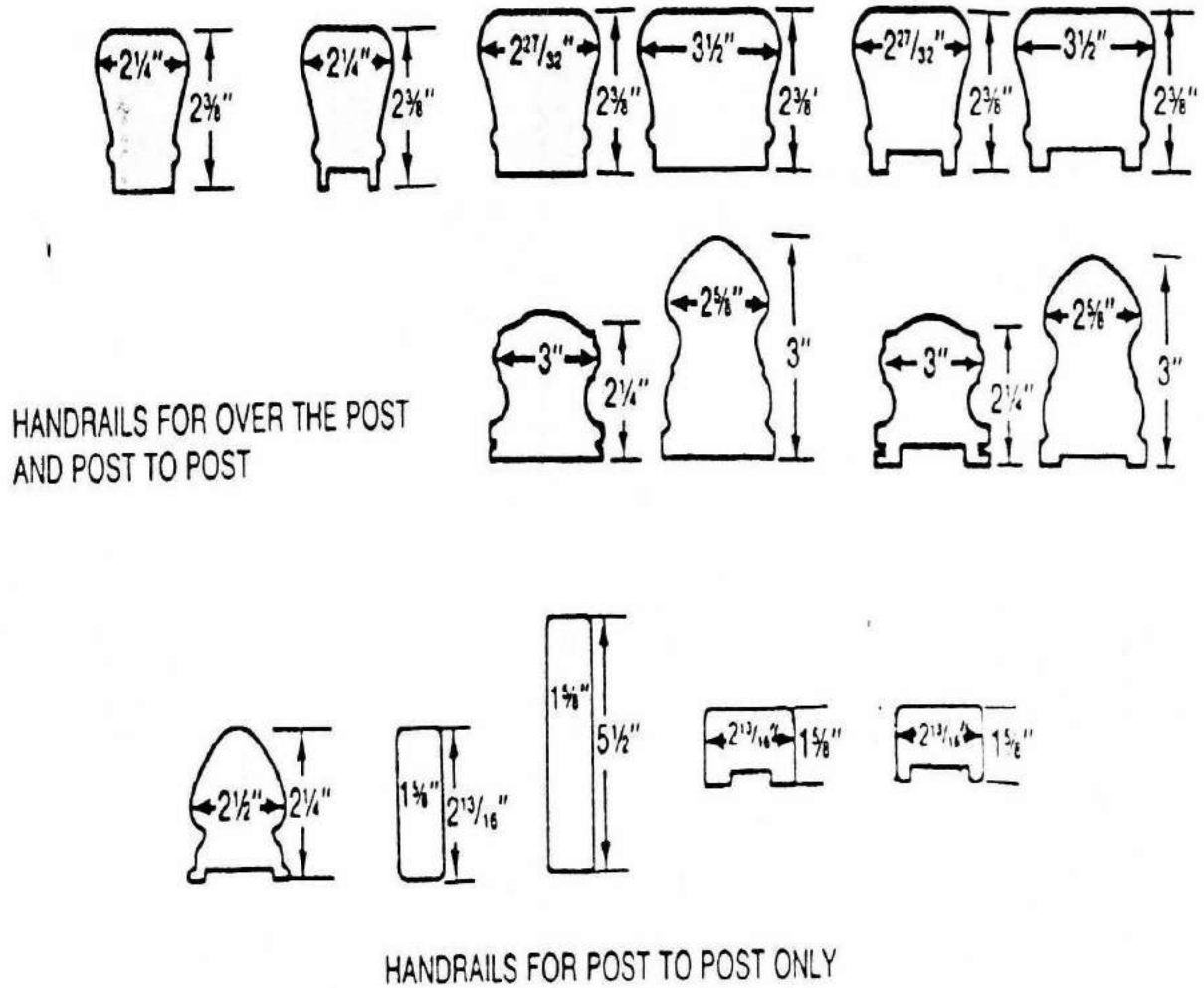


Fig. 80-12 Straight lengths of handrail are manufactured in many styles. (*Courtesy of L. J. Smith*)

STAIRS COMPONENTS/HAND RAIL

above treads that butt the wall. They are termed *open finish stringers* when they are placed on the open side of a stairway below the treads (Fig. 80-5). Finish stringer lineal stock is available in a 3/4-inch thickness and in widths of 9 1/4 and 11 1/4 inches.

Starting Steps

A *starting step* or bull-nose step is the first tread-and-riser unit sometimes used at the bottom of a

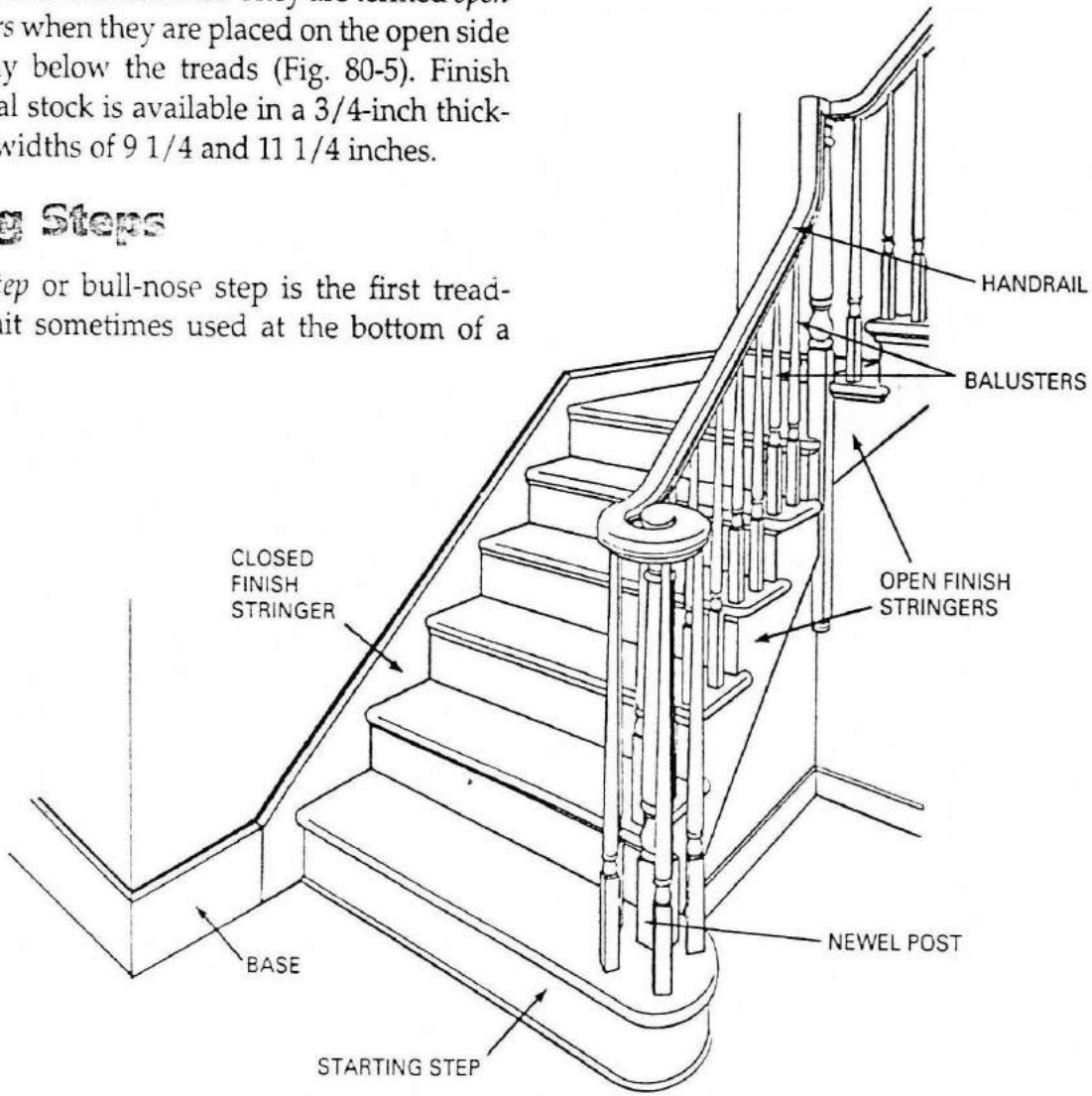
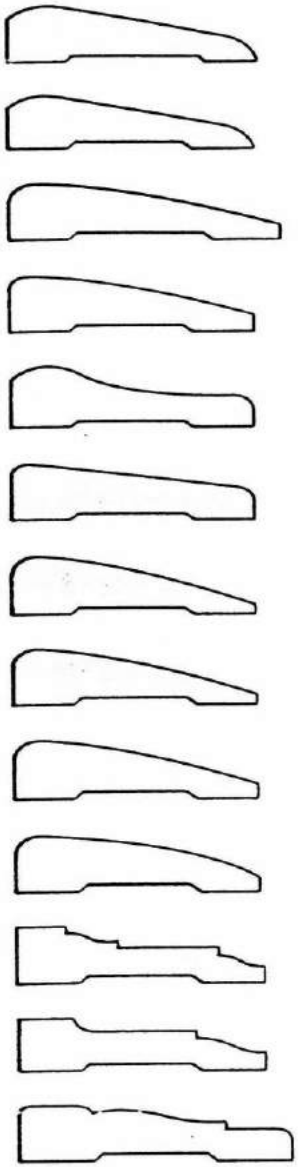


Fig. 80-5 Open and closed finish stringers trim the intersection of the stair body and the wall.

CASING

CASING



WM 306 $\frac{11}{16} \times 2\frac{1}{4}$

WM 307 $\frac{5}{8} \times 2\frac{1}{4}$

WM 315 $\frac{11}{16} \times 2\frac{1}{2}$

WM 316 $\frac{11}{16} \times 2\frac{1}{4}$

WM 321 $\frac{11}{16} \times 2\frac{1}{4}$

WM 324 $\frac{11}{16} \times 2\frac{1}{4}$

WM 327 $\frac{11}{16} \times 2\frac{1}{4}$

WM 328 $\frac{11}{16} \times 2\frac{1}{4}$

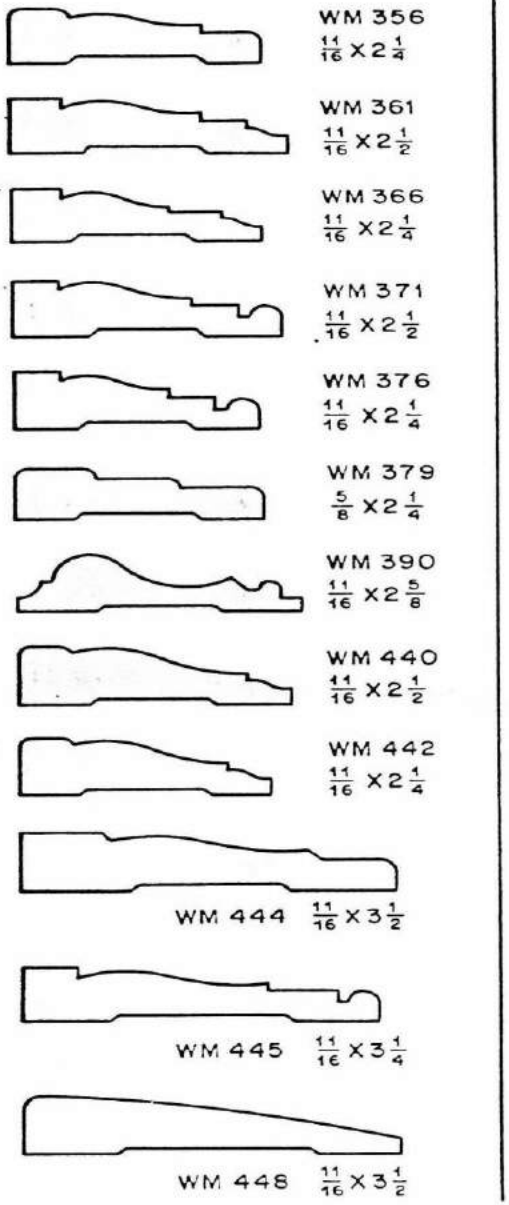
WM 329 $\frac{11}{16} \times 2\frac{1}{4}$

WM 330 $\frac{11}{16} \times 2\frac{1}{4}$

WM 332 $\frac{11}{16} \times 2\frac{1}{4}$

WM 346 $\frac{5}{8} \times 2\frac{1}{4}$

WM 351 $\frac{11}{16} \times 2\frac{1}{2}$



WM 356 $\frac{11}{16} \times 2\frac{1}{4}$

WM 361 $\frac{11}{16} \times 2\frac{1}{2}$

WM 366 $\frac{11}{16} \times 2\frac{1}{4}$

WM 371 $\frac{11}{16} \times 2\frac{1}{2}$

WM 376 $\frac{11}{16} \times 2\frac{1}{4}$

WM 379 $\frac{5}{8} \times 2\frac{1}{4}$

WM 390 $\frac{11}{16} \times 2\frac{5}{8}$

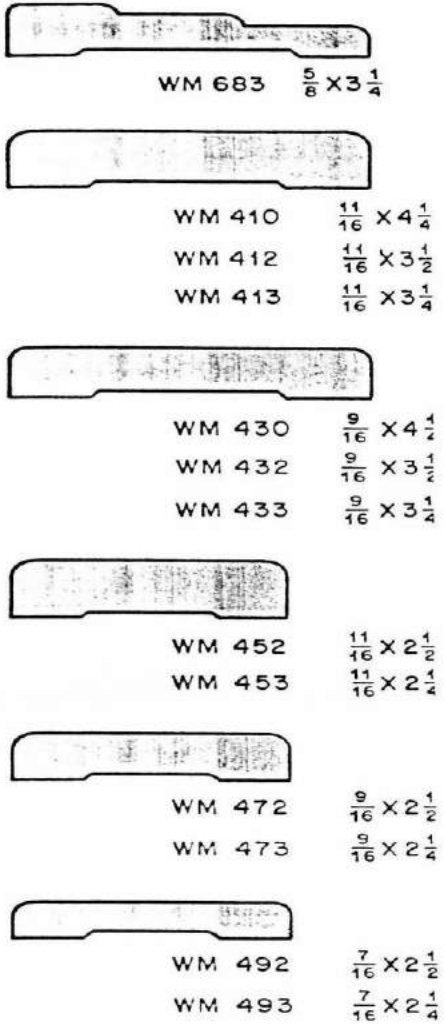
WM 440 $\frac{11}{16} \times 2\frac{1}{2}$

WM 442 $\frac{11}{16} \times 2\frac{1}{4}$

WM 444 $\frac{11}{16} \times 3\frac{1}{2}$

WM 445 $\frac{11}{16} \times 3\frac{1}{4}$

WM 448 $\frac{11}{16} \times 3\frac{1}{2}$



WM 683 $\frac{5}{8} \times 3\frac{1}{4}$

WM 410 $\frac{11}{16} \times 4\frac{1}{4}$

WM 412 $\frac{11}{16} \times 3\frac{1}{2}$

WM 413 $\frac{11}{16} \times 3\frac{1}{4}$

WM 430 $\frac{9}{16} \times 4\frac{1}{4}$

WM 432 $\frac{9}{16} \times 3\frac{1}{2}$

WM 433 $\frac{9}{16} \times 3\frac{1}{4}$

WM 452 $\frac{11}{16} \times 2\frac{1}{2}$

WM 453 $\frac{11}{16} \times 2\frac{1}{4}$

WM 472 $\frac{9}{16} \times 2\frac{1}{2}$

WM 473 $\frac{9}{16} \times 2\frac{1}{4}$

WM 492 $\frac{7}{16} \times 2\frac{1}{2}$

WM 493 $\frac{7}{16} \times 2\frac{1}{4}$

2. PROSES PEMBUATAN

Cara pembuatan *mouldings* ada dua yaitu:

1. Cara konvesional

- Kayu gergajian kering (dried kiln) → *planer/surfacer* → *single moulder* *mouldings* →

  Kelemahan :

- Profil terbatas
- Produksi lambat

2. Cara modern

Kayu gergajian kering (dried kiln) *Multiple moulder* *Mouldings*

→

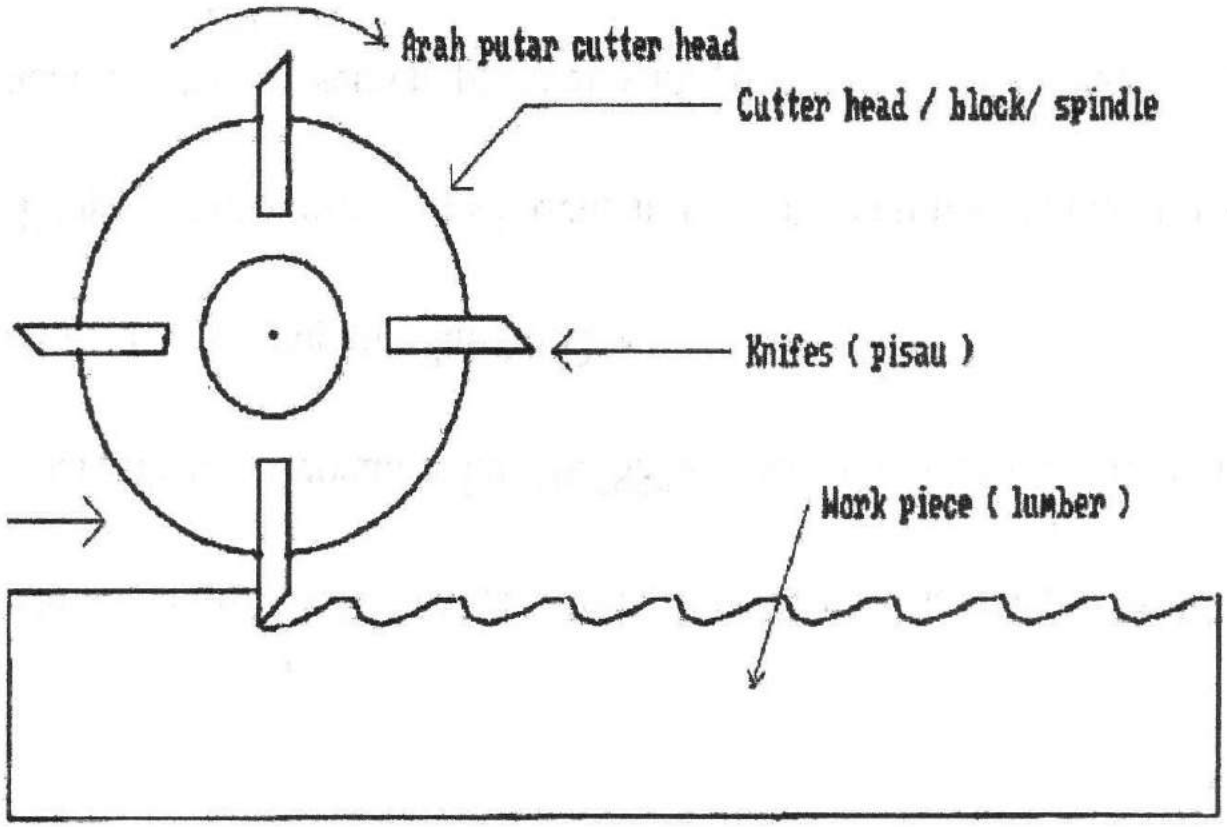
→

Proses dasar pembuatan moulding :

- Proses dasar terjadi antara kayu dan *mesin moulding*, disebut *PERIPHERAL MILLING*, yaitu :

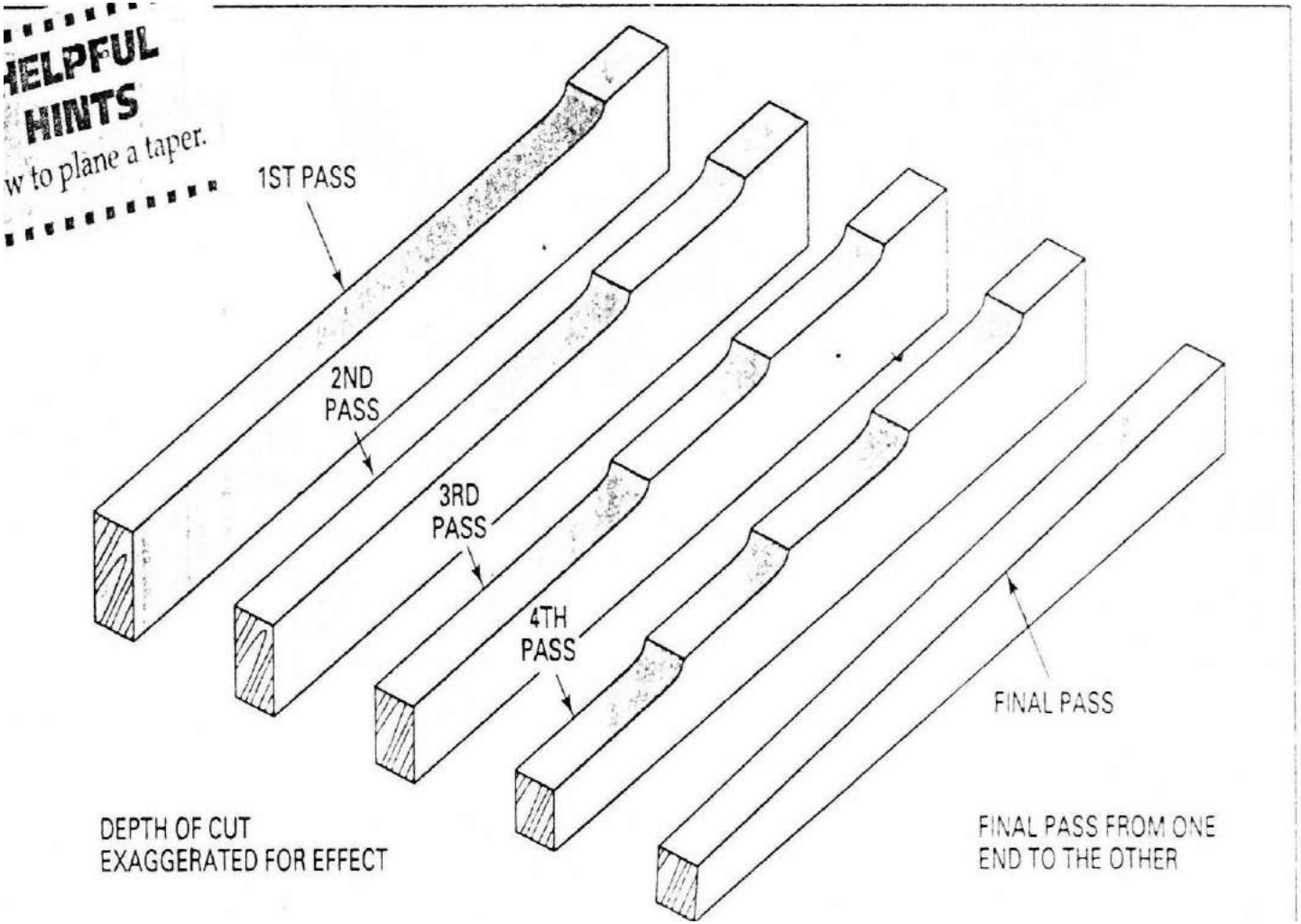
Proses pengeratan sehingga permukaan kayu dikeluarkan dalam bentuk *single chip* (serpihan tunggal) oleh sayatan beberapa buah pisau yang dipasang pada sisi luar *cutter head* yang berputar cepat.

Proses dasar pembuatan moulding :



Gambar 1. Aksi proses pisau moulding mengerat kayu

Proses dasar pembuatan moulding :



Faktor-faktor kualitas:

A. Bahan baku

1. Jenis kayu
2. Kualitas kayu gergajian
   a. Kadar air
   b. Kelurusan permukaan
   c. Variasi keratan
   d. Ukuran sortimen
   e. Kondisi cacat
      - Cacat fisis : mata kayu, pecah, serat bergelombang
      - Cacat biologis : lubang gerek, jamur, lapuk

Faktor-faktor kualitas:

B. Proses produksi

1. Jenis mesin dan peralatan
2. Kecepatan putar cutter head dan kecepatan umpan
   a. Ketajaman
   b. Jenis logaman
   c. Variasi keratan
3. Pemeliharaan
   a. Pengasahan pisau
   b. Pemeliharaan cutter head
   c. Pemeliharaan mesin
4. Operator

Proses *Moulding* skala komersil terdiri 3 tahap:

1. Persiapan kayu gergajian (lumber) dari sawmill
2. *Rough end process*
3. *Moulding process*

1. Persiapan kayu gergajian (lumber) dari *sawmill*

   Jika pasokan dari *sawmill* dalam bentuk kayu gergajian basah atau kering udara, maka urutan prosesnya :

   a. Bongkar muatan (unloading)
   b. Sortasi (grading)
   c. Penyusunan (stacking)
   d. Pengeringan dalam *kiln drier* (drying)
   e. Penyimpanan di gudang kering
   f. Kirim ke *rough end process*

Mouldings dipersyaratkan dengan kadar air kayu 6 – 8 % (EMC).

- Pengeringan alami-udara hanya bisa mencapai 14-20 %.

Pengeringan buatan (kiln drier) memberi keuntungan :

a. Kadar air kayu bisa lebih rendah (<10 %)
b. Waktu pengeringan lebih cepat
c. Hasil pengeringan lebih baik
d. Kontrol pengeringan yang baik dapat meminimalkan cacat kayu.

Pengaruh pengeringan kayu pada proses moulding :

1.Kadar air terlalu rendah

a.Kayu pecah, karena tekanan pisau

b.Power konsumsi mesin tinggi

2.Kadar air terlalu tinggi

a.Serat kayu berbulu

b.Noda pada bilah kayu

c.Serat kayu terangkat

3.Pengeringan yang buruk

a.Kayu gergajian tidak lurus

b.Dimensi kayu tidak seragam

2. Rough end process

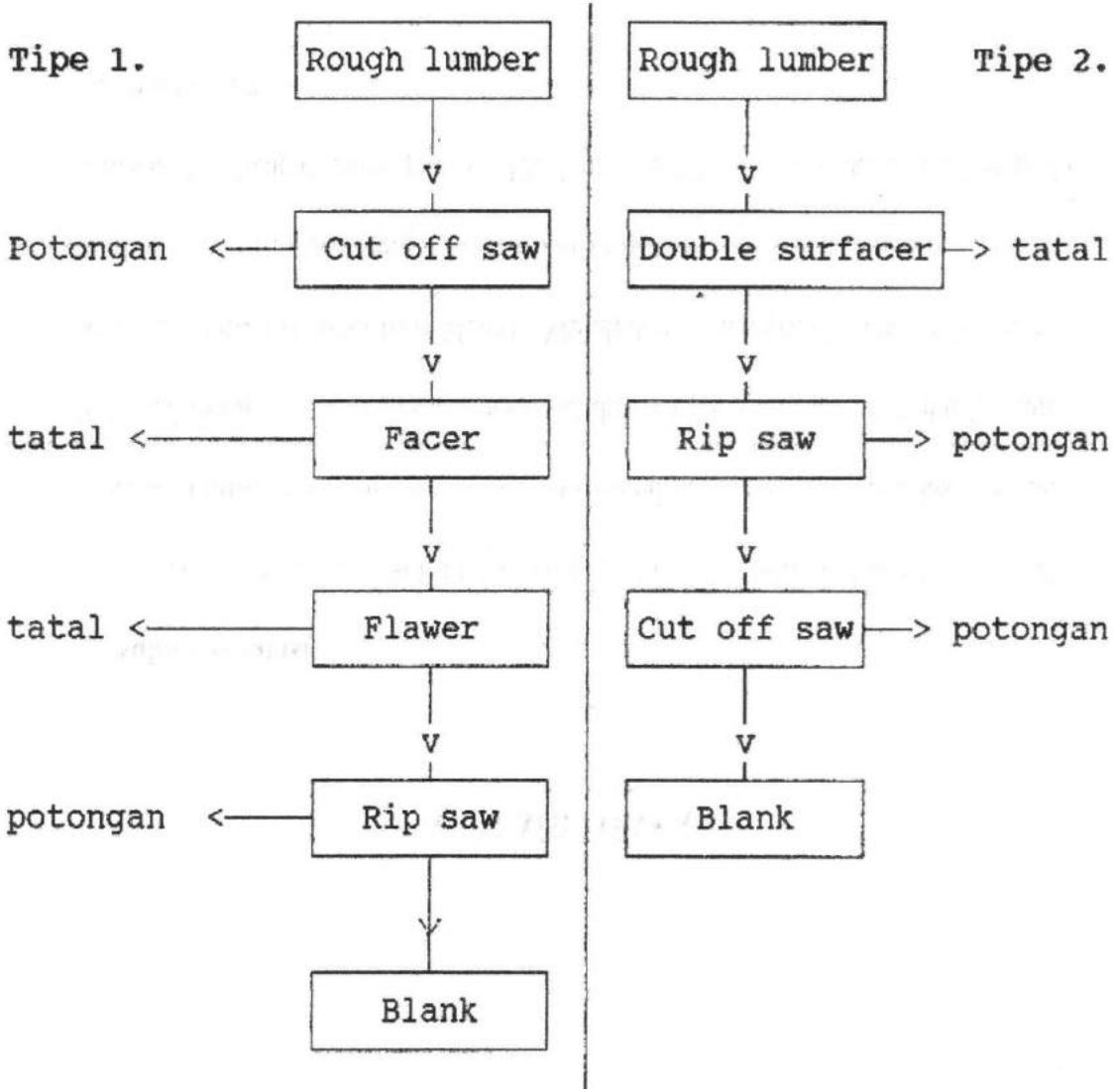
- Kayu gergajian yang sudah dikeringkan disebut *Rough lumber,* dan siap diproses dalam *Rough end process*. Hasil/outputnya disebut *Blank*, yaitu potongan balok empat persegi panjang dengan semua sudutnya sudah siku dan sudah diserut kasar ataupun halus.

Tujuan *rough end process* :

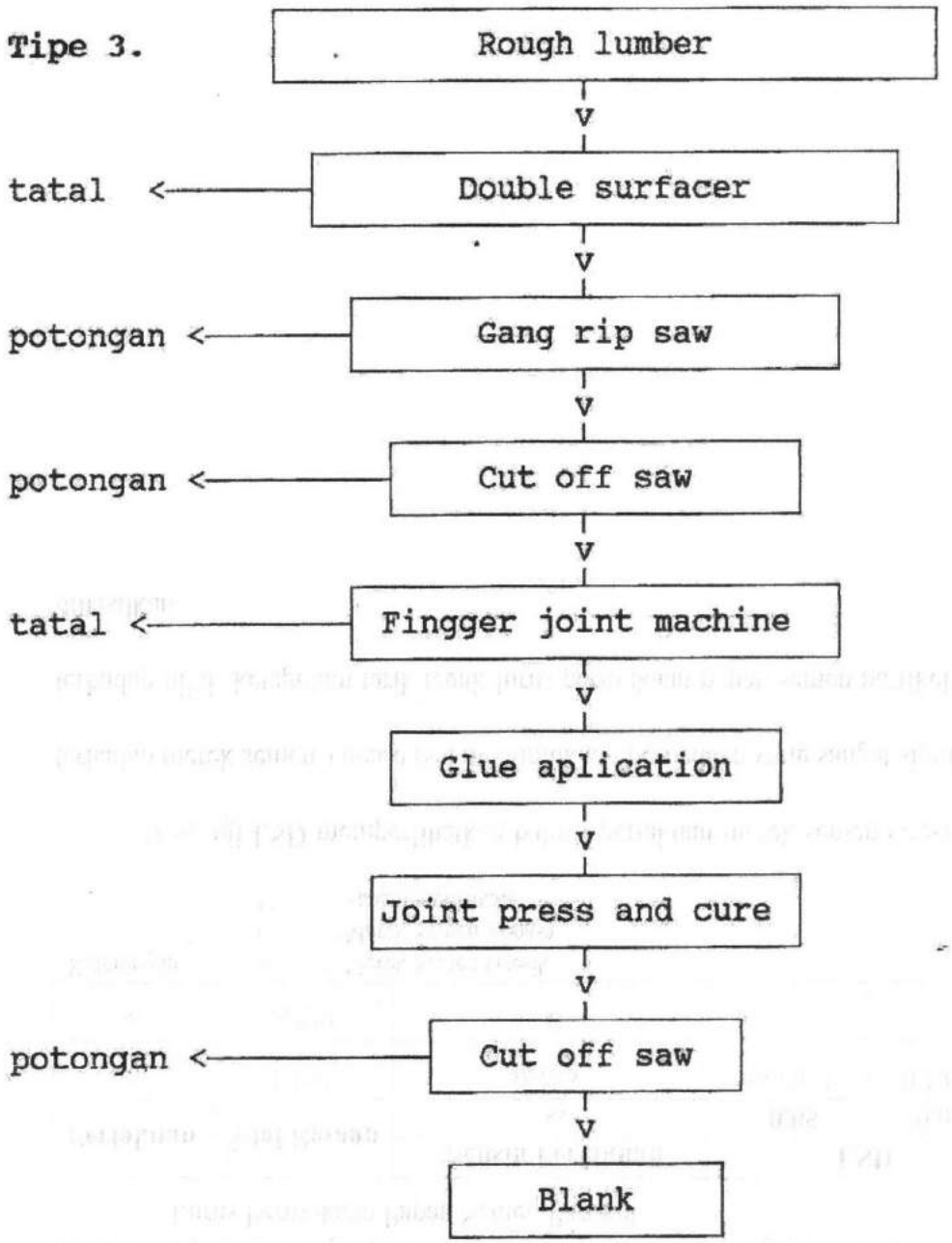
a. Mengeluarkan cacat pada *rough lumber*
b. Membersihkan permukaan kayu
c. Membuat rough lumber persegi empat
d. Meperkecil beban pisau *moulder*

Beberapa tipe *Rough end process* :

Tipe-tipe yang umum adalah sebagai berikut :



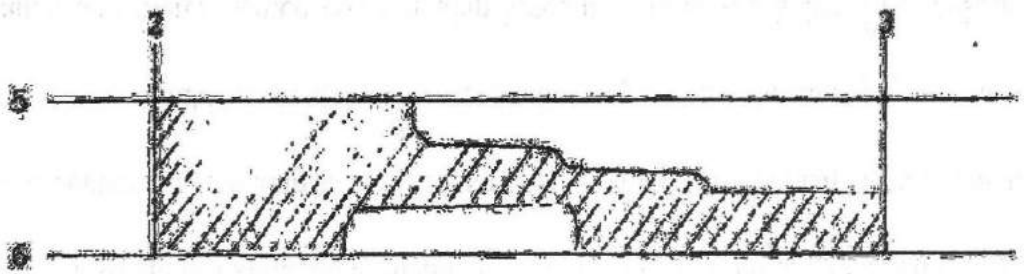
Tipe 3.


Rough lumber
Double surfacer
tatal
Gang rip saw
potongan
Cut off saw
potongan
Fingger joint machine
tatal
Glue aplication
Joint press and cure
Cut off saw
potongan
Blank

3. *Moulding process*

- Dalam *Moulding process*, blank dibentuk melalui langkah pengeratan oleh beberapa buah *cutter head* pada mesin *moulder*. Biasanya mesin *moulder* modern mempunyai 6 atau lebih *cutter head*. Setiap *blank* akan melewati secara berurutan *cutter head*-*cutter head* tersebut.

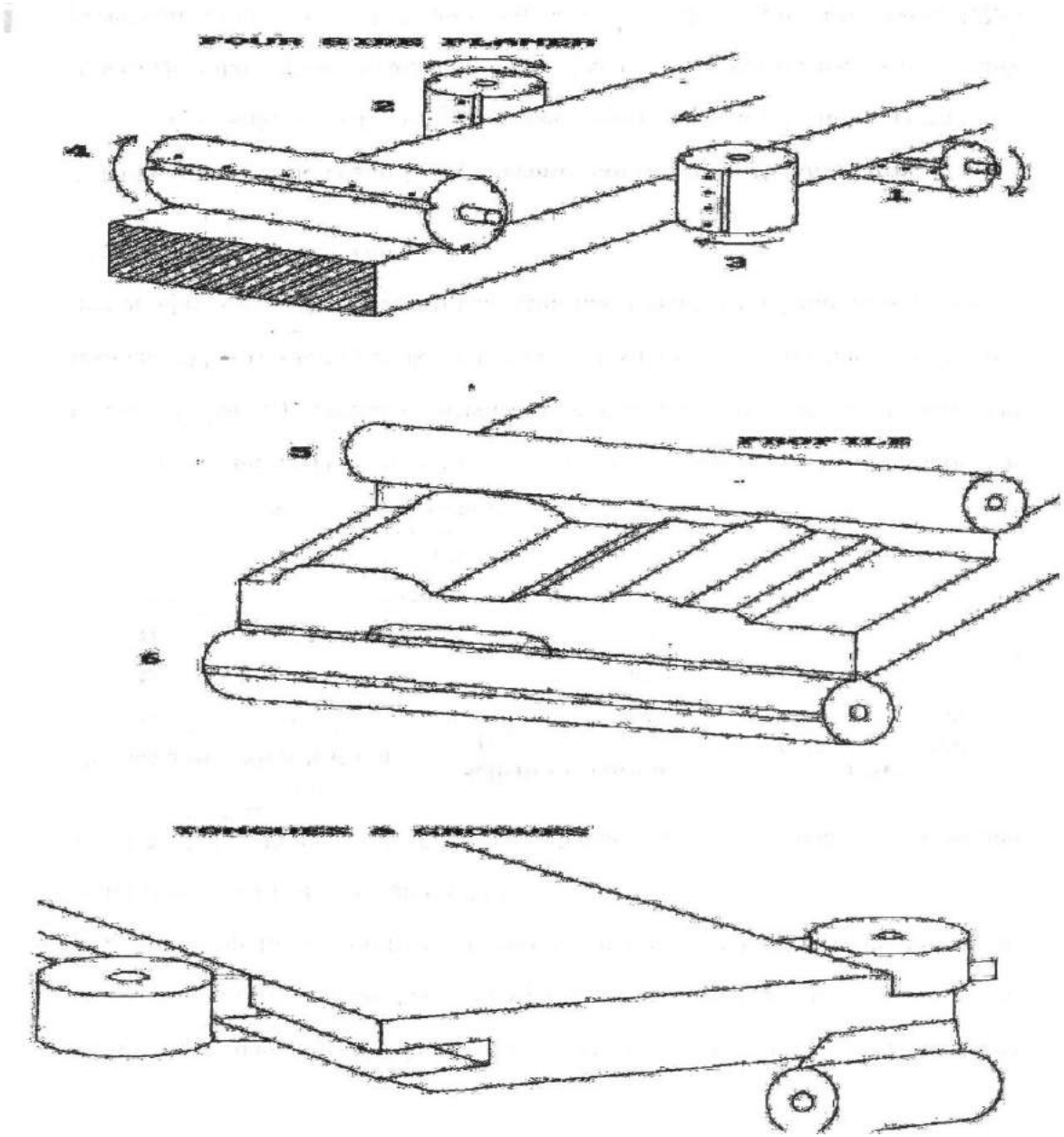
Urutan proses pengeratan :



Spindle/Cutter Block	Operation	Minimum cut, mm
1.	Pre planing (Serut awal permukaan)	2,0 *
2.	Reference edge (Serut sisi tebal)	2,0 *
3.	width dimension (Serut sisi lebar)	2,0 *
4.	Thickness dimension (Serut sisi tebal)	2,0 *
5.	Finish profile A	0,5
6.	Finish profile B	0,5

*) According to accuracy of sawing

Beberapa proses pengeratan dengan *cutter head* :



CUTTER HEAD

3. CACAT MOULDINGS

A. Cacat alami :

1. Mata kayu
2. Hati rapuh
3. Kantung damar
4. Kantung getah
5. Kayu gubal
6. Lapuk/busuk
7. Lubang serangga
8. Perubahan warna
9. Serat tertekuk
10. Serat miring

B. Cacat bentuk :

1. Membusur
2. Lengkung
3. Memuntir
4. Mencawan
5. Jajaran genjang

C. Cacat serat terpisah :

1. Retak
2. Belah
3. Pecah

D. Cacat teknis atau permesinan :

1. Serat berbulu
2. Serat terangkat
3. Serat terserpih
4. Serat tersobek
5. Bekas serpihan
6. Bakas pisau
7. Bekas rol pengumpan
8. Hangus
9. Terserut dan terlewat
10. Tergerus mesin

SELESAI