

TECHNIQUES OF PRE-RIPPING OF LARGE DIAMETER LOG USING CHAINSAW

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INTRODUCTION

As part of a routine procedure in any log processing mill, sawlogs are rip-sawn into planks of nominal thickness and width using a band saw or a gang saw (Figure 1). However, the band saw and gang saw have a certain functional constraint related to the actual diameter of the sawlog. For example, the operation of band saw in FRIM's sawmill is limited to logs having a diameter of 100 cm and below. Logs of greater diametrical dimension are restricted by the blade-opening gap and thus unable to be processed (Figure 2). Nevertheless, these oversized logs can be pre-ripped into halves or more sections using a chainsaw. This article provides a technical guideline for pre-ripping of large diameter logs using a chainsaw before processing to desired finished sizes using band saw.



(a)



(b)

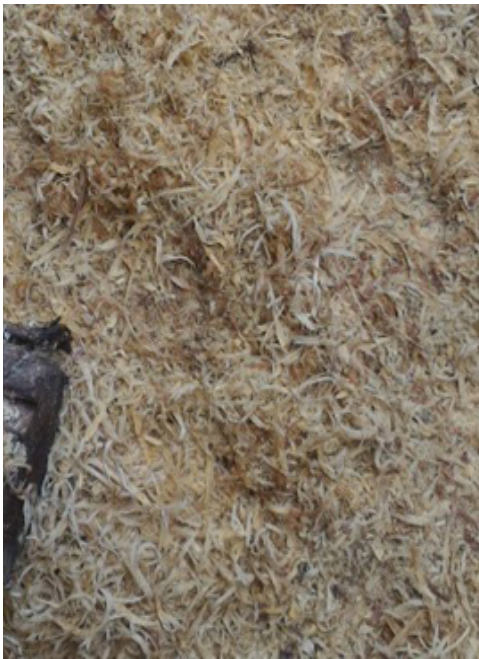
Figures 1a & 1b A band saw (a) and a gang saw (b) machines



Figure 2 Blade-opening gap of a band saw (red arrow)

SAWING PERFORMANCE OF CHAINSAW

To ensure that a chainsaw can easily rip a log, the cutting teeth need to be sharpened. The correct procedure of sharpening the cutting teeth of a chainsaw is important to achieve a smooth sawn surface. For example, the sharpening of cutting teeth using a hand file should be done only in a single filing-direction to obtain the proper sharpness. Sharp teeth considerably reduce vibration and muscle stresses on the operator during sawing. Furthermore, teeth sharpness considerably affects the stability of the sawing. Thus, a straight sawing kerf is much easier to achieve with sharper teeth. Figures 3a and 3b demonstrate the difference of dust formation by sharp and blunt teeth during sawing. Sawing by cutting teeth of appropriate sharpness is indicated by the formation of particle-shaped residue (Figure 3a). On the other hand, sawing of less sharp or blunt cutting teeth produce grainy-form residue (Figure 3b). Besides, the process of sawing a log using blunt cutting teeth can be time-consuming compared to sharp teeth.



(a) Sharp teeth >> wood particles



(b) Blunt teeth >> grainy residue

Figures 3a & 3b Photos showing the difference of residue formed by sharp and blunted cutting teeth

TECHNIQUES AND POSITIONING OF LOG

A secured positioning of the log is important to obtain the accurate sawing and to avoid injury to the operators. The main device for pre-ripping of a log is a chainsaw equipped with sharpened cutting teeth. Initially, the log is placed on two or more stickers in a size of 100 mm thick to allow some space for forklift manoeuvres and to prevent the cutting teeth from hitting the ground during sawing. Timber wedges of 50 to 100 mm thick are then inserted between the log and the stickers to prevent the log from rolling sideways. Nail, thin rope and chalk are used to determine and mark the kerfing alignment along the length. Thin timber wedges of 10 to 20 mm thick and approximately 500 mm long are prepared. These wedges are to be inserted into the saw kerf in order to maintain the gap for the subsequent sawing (Figure 4).



Figure 4 Thin wedges are inserted into saw kerf to maintain the gap for the subsequent sawing

Pre-rip technique 1 (Round log)

Rip-sawing of a symmetrically round log using a chainsaw is the easiest. Tree species such as kapur (*Dryobalanops aromatica*), merawan (*Hopea* spp.) and kempas (*Koompassia malaccensis*) are commonly having a large, straight and round log. For this form of logs, two sawing kerfs of opposite sides are required. The intended cut is marked and sawn vertically to produce the first kerf from one end of cross-sectional surface to another (Figure 5). During the process, timber wedges are inserted into the saw kerf to maintain the gap for the subsequent sawing. Then the position of the log is overturned using a forklift to produce the second kerf on the opposite side. The alignment of the kerfs has to be carefully measured to ensure a straight splitting.



Figure 5 Pre-ripping of a round log using chainsaw

Pre-rip technique 2 (Fluted or irregular-form log)

Large logs of non-dipterocarp trees such as pulai (*Alstonia angustiloba*) and bungor (*Lagerstroemia* spp.) are normally having fluted and irregular shapes as shown in Figure 6 (Lim et al. 2011). Rip-sawing of logs with unsymmetrical forms using a chainsaw is slightly difficult, particularly to determine the most appropriate divisions. Besides, the positioning of the log during sawing is crucial to avoid rolling movement even if it has been secured with wedges. Before pre-ripping, protruding branch collars need to be removed to ensure stability during sawing. Log of unsymmetrical forms can be pre-ripped into three or more divisions of ideal sizes and shapes. The sawing should be targeted at the fluted section in order to maximize the sawing recovery. Although the processes seem to be physically easy, the results could be unsatisfactory and wasteful.



Figure 6 Pre-ripping of logs of irregular shape is slightly difficult

Pre-rip technique 3 (Rotten log)

Dead trees are potential to have rotten parts especially at the core. Rotten log contains soften fibre, muddy soil, termite and insect nests. Gigantic trees such as kapur (*Dryobalanops aromatica*) and jelutong (*Dyera costulata*) are regularly found dead due to lightning strike. Sawing the logs from dead trees containing rotten sections could damage or even break the cutting teeth and cause injury to the operators. Thus, these logs need to be cleaned from the rotten sections before sawing. Soil and muddy substances at the peripheral surface are scrapped away from the log using a scrapper or other similar tools (Figure 7). The pre-ripping of a rotten log using a chainsaw is similar to technique 1 and 2 except that during sawing, the cutting teeth is driven to a certain depth to avoid the rotten section at the core.



Figure 7 Soil and muddy substances at the peripheral surface are scrapped away from the log

Pre-rip technique 4 (Unseparated log)

For excessively large logs that are unable to be fully sawn by a chainsaw, an extra separation technique using a forklift is required. Initially, the sawlog is pre-ripped consistent with either techniques 1, 2 or 3 based on the shape of the log. Once completed, the log is lifted approximately 2 meters high using a forklift and freely rolled to smash onto the ground. The process can be repeated multiple times until the log has broken. Figure 8 illustrates the steps to lift and roll an unseparated pre-ripped log.

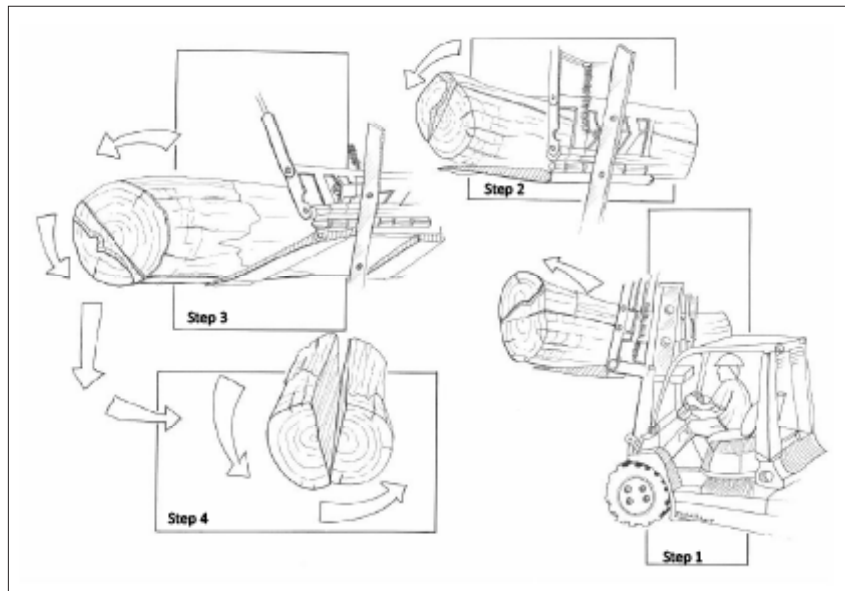
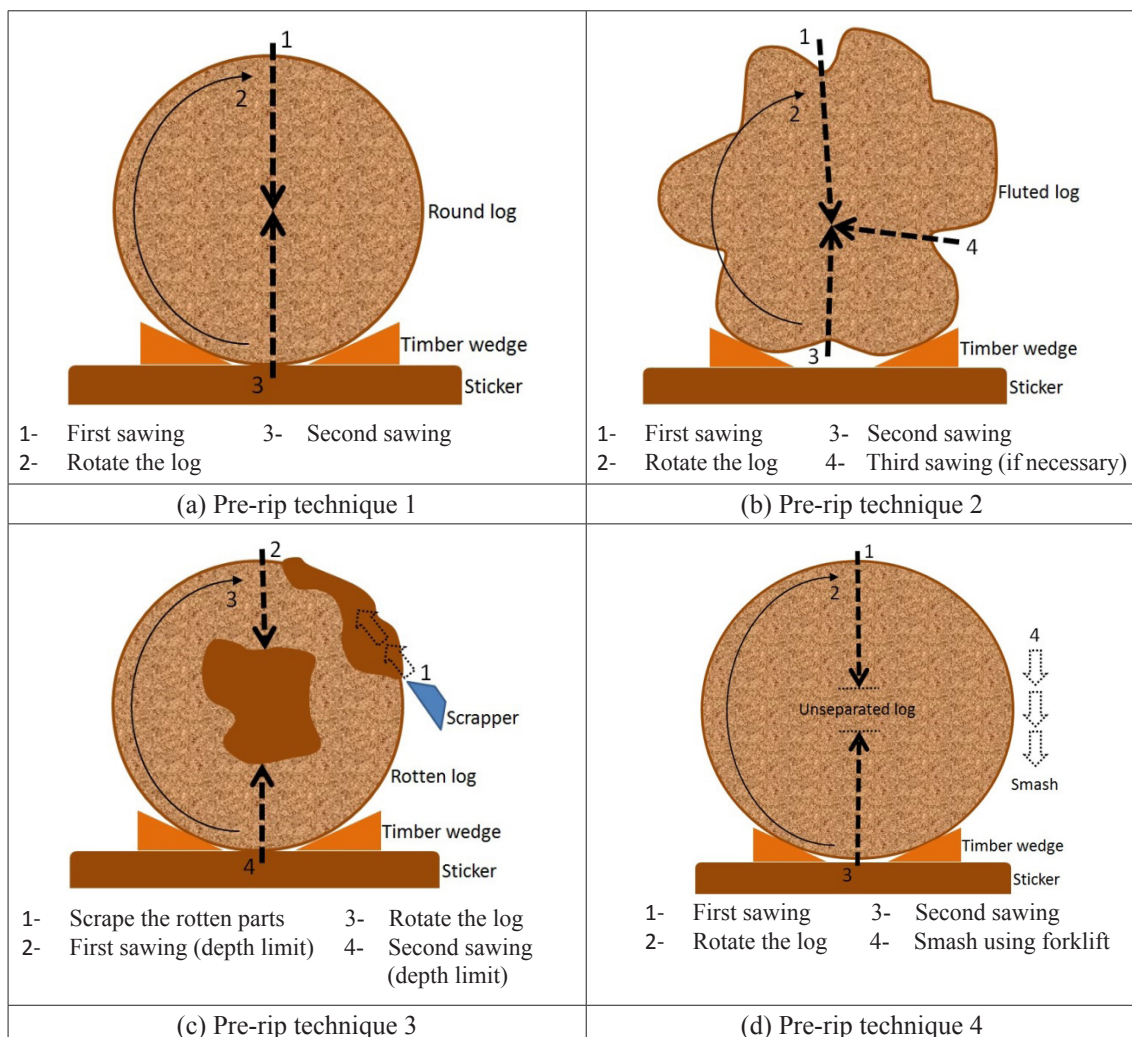


Figure 8 The pre-ripped log is lifted and freely rolled to smash the ground

Overall procedure to pre-rip logs of different configurations

Since there are several possible configurations depending on the shapes of the log, the appropriate techniques to pre-rip a log are shown in Figures 9a to 9d.



Figures 9a to 9d Techniques to pre-rip a log using a chainsaw

SUMMARY

A chainsaw can be used to pre-rip an oversized log that cannot be directly processed using a band saw. The aforementioned techniques 1 to 4 have been applied to logs of different species at the Log Processing Workshop of FRIM due to the limitation of the blade-opening gap of the existing band saw. Once pre-ripped into smaller sections, the logs can be processed into planks of desired sizes using a band saw. Even though the processes seem to be physically easy, the results could be unsatisfactory and wasteful without the correct technique and skill.

REFERENCES

LIM SC, GAN KS & TAN YE. 2011. Introduction. Pp 1–6 in (Lim SC, Gan KS & Tan YE) Properties of *Acacia mangium* planted in Peninsular Malaysia. Forest Research Institute Malaysia, Kepong.

Band saw and gang saw machines have a certain functional constraint related to the diameter of the sawlog. However, an oversized log can be pre-ripped into halves or more sections using a chainsaw. There are several possible pre-ripping techniques depending on the shapes and condition of the log. This article provides a technical guideline for pre-ripping of large diameter logs using a chainsaw.

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