

Testing techniques of cleaving oak logs with mallet and wedges – an experimental setup

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Abstract: Cleaving round logs with mallet and wedges is an old technique for processing round timber. The method of cleaving logs into two halves was traditionally used to make boards and beams. In Norway, several techniques for processing logs into boards and beams are known. All known historical sources are for cleaving of logs from softwood and birch. Oseberg Viking Heritage Foundation makes replicas of Norwegian Viking ships. Ship boards for Viking ships are commonly made from oak, and it is therefore relevant to investigate techniques for cleaving oak. The study describes four techniques for cleaving of logs from oak into two halves. An experimental approach was designed to evaluate the applicability of the four methods for cleaving round logs from oak. Each technique was tested on two logs. The study is part of an ongoing effort to consolidate our experience with processing oak logs.

Introduction

Using hand held tools, such as axes or knives, to craft wood is an important part of the Norwegian heritage. Before the introduction of water-powered saw mills, cleaving of logs was the only option for making boards and beams. Wood materials for buildings and boats made before the 15th century are made from cleaved logs. The study was conducted as part of two research projects that focused on assessing of raw material in forest, assessment of logs, techniques for cleaving of logs as well as storage and traceability of raw material.

Background

There are few historical records describing cleaving of softwood logs. Sandvig (1931) investigated methods and equipment, and demonstrated how an old type of axe, *bleggøks* (Figure 4), could be used to make an incision in the log before inserting wedges. Borch (1848) provided a visual description of a method used by the Norwegian Army Corps of Engineers. Contemporary descriptions of traditional techniques for cleaving logs are available for (1) pine and birch (Godal 2012) and (2) pine and oak (Finderup 2017, Melin 2017).

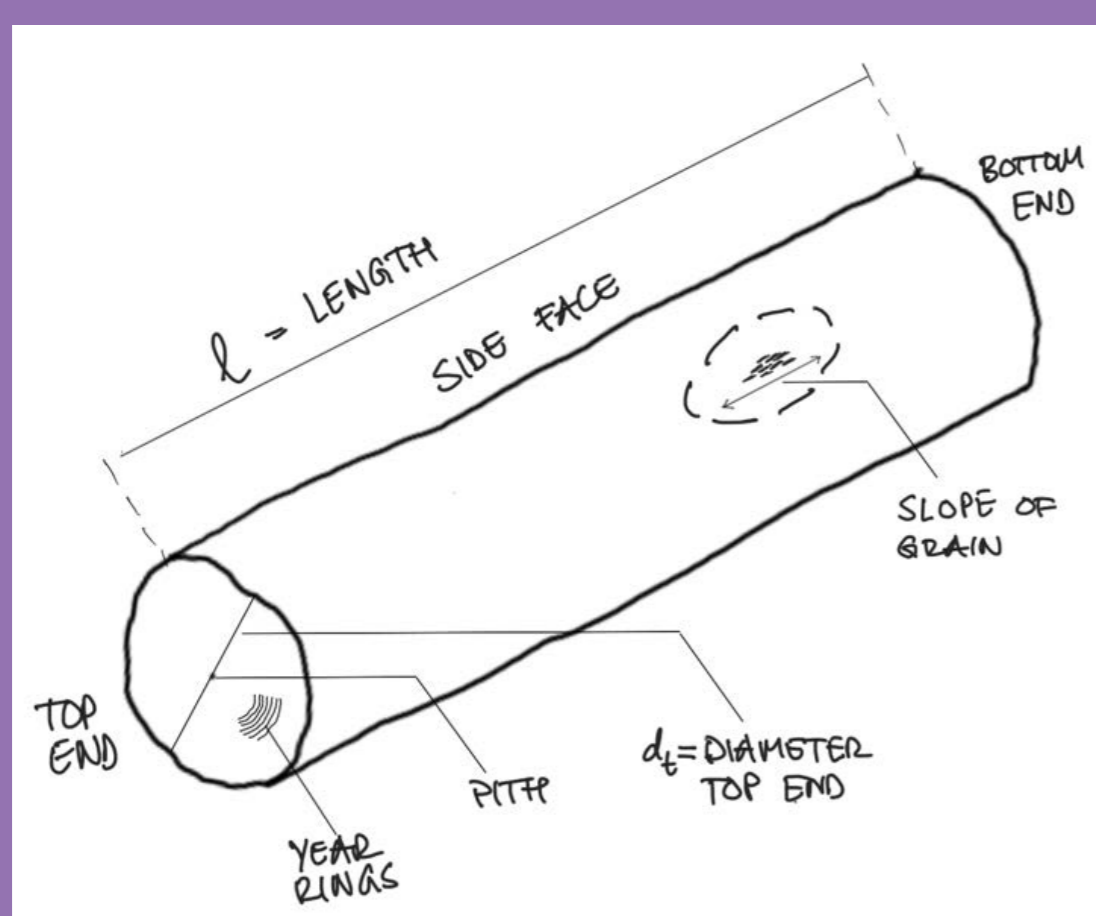


Figure 1. Drawing of round log with description of relevant terms.

Study

The study was conducted by cleaving long ($d_t=30$ cm, $l=5$ m) oak logs (Figure 1) in two halves. The following techniques were used: 1) Cleaving parallel to grain from bottom end of log, 2) Cleaving parallel to grain from top end of log, 3) Cleaving perpendicular to grain from side face of log and 4) using *bleggøks* when cleaving perpendicular to grain from side face of log.

The logs were cleaved using wedges, and a mallet (Figure 2 and 3). Techniques 1), 2), 3) were used to cleave two logs each (cf. Figure 4 and 5). One log was cleaved using *bleggøks* (Figure 6 and 7), as described by Sandvig (1931). The logs were assigned randomly. For each log, the outcome was evaluated according to duration of cleave, symmetry of the two halves, cleanness of surface and an overall evaluation of the process.

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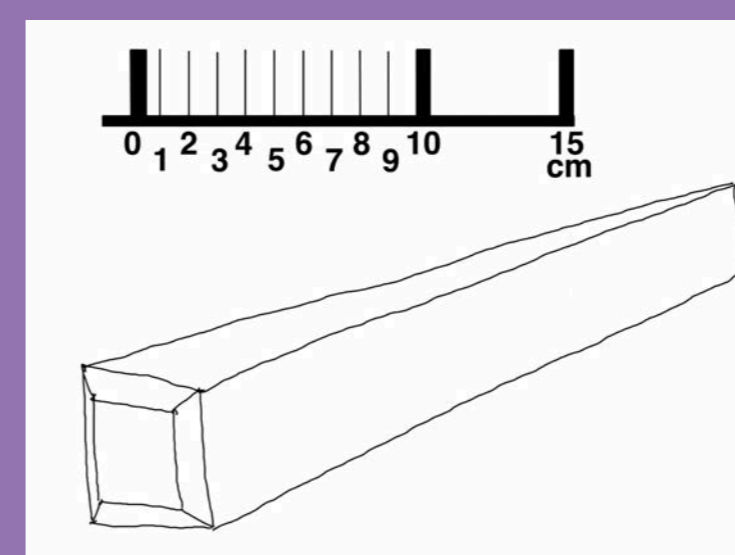


Figure 2. Wood wedge used for cleaving log.

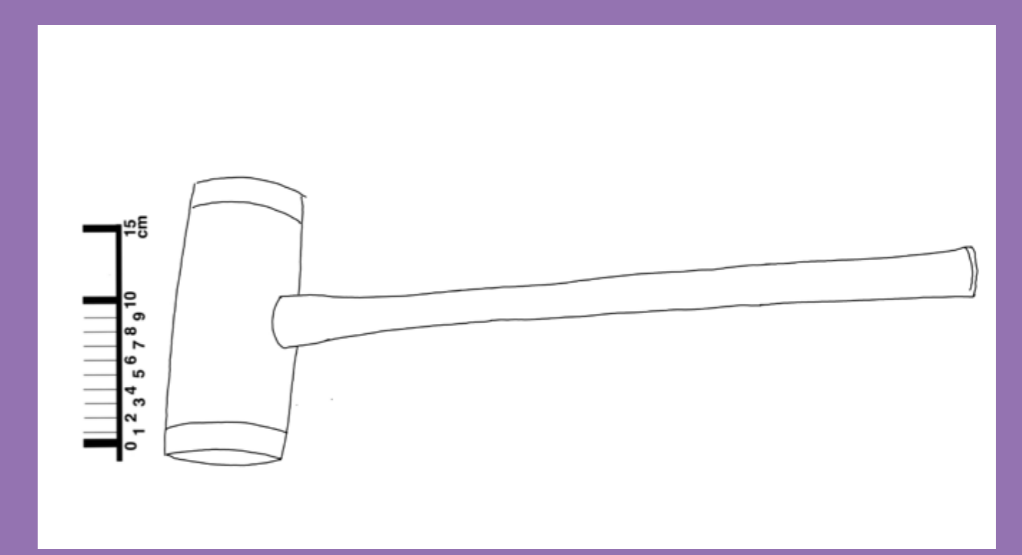


Figure 3. Mallet used for driving wedges.

Results and discussion

The study is the first Norwegian experimental approach to cleaving oak. In principle, all the four techniques can be used for cleaving of logs from oak. The results from the study indicates that the choice of technique should be based on the quality of the log. It is therefore important to evaluate the quality of each log before assigning the technique. For example, technique 2) was inadequate for logs with high slope of grain. The study was not conclusive on whether the use of *bleggøks* was an advantage when cleaving oak logs.



Figure 4. Cleaving parallel to grain, from bottom end of log. Both wood and steel wedges are used.



Figure 5. Cleaving perpendicular to grain, from side face of log. Only wooden wedges are used.

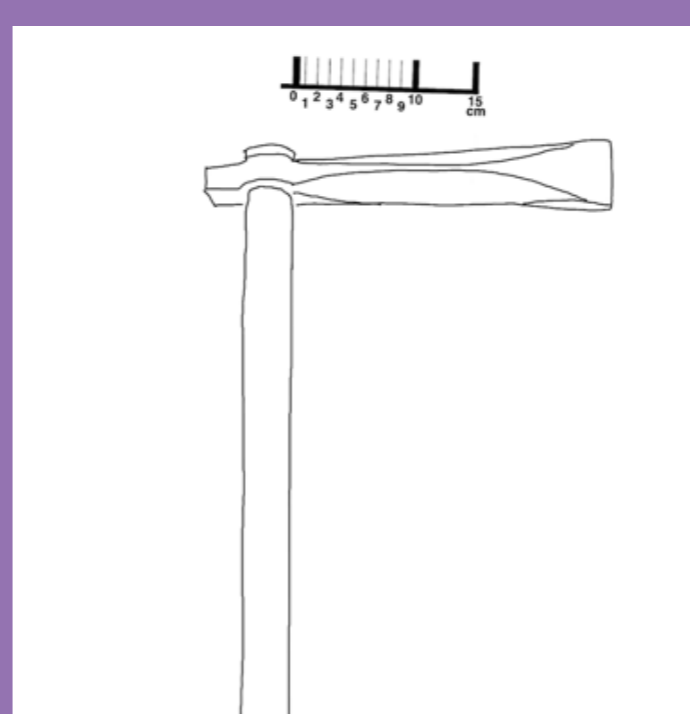


Figure 6. *Bleggøks* used for making incision in log.



Figure 7. Using the *bleggøks* to make an incision in the log.

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