

19 February 2010

**ECONOMIC COMMISSION
FOR EUROPE**

**FOOD AND AGRICULTURE
ORGANIZATION**

Timber Committee

European Forestry Commission

Joint FAO/UNECE Working Party
on Forest Economics and Statistics

Thirty-second session
Geneva, 24 - 25 March 2010
Agenda item 6 of the provisional agenda

Guidance on Work Area 1: Markets and Statistics

AGENDA ITEM 6.5 – FOREST PRODUCTS DATA HARMONIZATION CONCERNS

Note by the secretariat

Summary

This document presents data harmonization matters which came to light during the meeting of the Task Force on Forest Products Conversion Factors and during the process of collecting and analyzing the questionnaire results on forest products conversion factors. This paper is not advocating that all units need to be standardized, as there may be good reasons for the differences, but rather to make the Working Party aware of the differences and to suggest that understanding the differences will make more meaningful analyses. In addition, it would appear that standardized units for reporting purposes need to be clarified, so that there is a basis for harmonization. Two key areas that have been identified as having harmonization challenges are roundwood volumes and sawnwood (primarily coniferous) volumes.

I. Introduction

1. When the Task Force on Forest Products Conversion Factors met in Geneva in 2008, it was noted that there are differences in the measurement units reported that not only affect conversion factors, but have an impact on reported volumes (production statistics). Some of these differences are known and efforts have been made to harmonize the data. In other cases, discrepancies have not been quantified nor addressed.

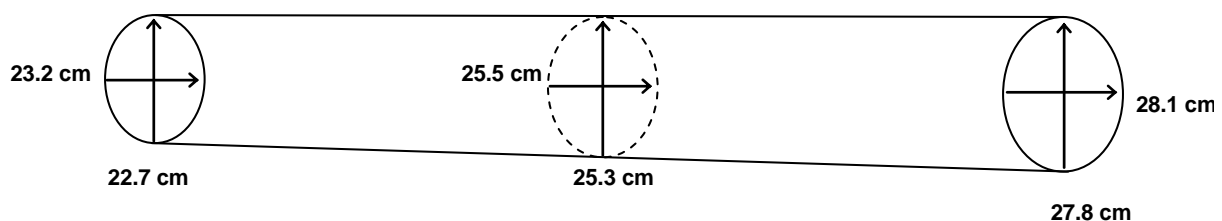
2. The reasons for these harmonization problems are linked to traditional methods of measurement, manufacturing processes, market tradition, and the resource which exists in the various subregions and countries. This paper is not advocating that all units need to be standardized, as there may be good reasons for the differences, but rather to make the Working Party aware of the differences and to suggest that a better understanding of the differences will properly harmonize data and make meaningful analyses. In addition, it would appear that standardized units for reporting purposes need to be clarified, so that there is a basis for harmonization. Two key areas that have been identified as having harmonization problems are roundwood volumes and sawnwood volumes. There may be other areas as well, but these two stood out as being the most significant and visible.

II. Roundwood

3. Roundwood is reported in cubic metres (m³) under bark and is commonly referred to as log scale. In general, log scales attempt to either predict the displaced volume of the log (cubic log scale), or as is the case in the US and some regions of Canada, in units of predicted output of sawnwood (board foot log rule). Where roundwood volume is scaled over bark, determined based on small-end only (volume in the taper is ignored), or in units of board feet, the discrepancy with “true” cubic metre under bark is largely known, thus harmonized, which is the case for data from the US and Canada (when original volumes are reported in board feet), Finland and Ireland (over bark volume); and Sweden (volume based on small-end cylinder). Where the differences are not so large (but still significant), it is likely that no adjustment is made to the reported volumes.

4. The major issue is not so much with the cubic log volume formula used by the national standards; there are several different formulas, but most give similar results for logs with typical attributes, so long as the inputs into the formula (length and diameter are applied uniformly). However, there are some small differences in the formulas, with each formula having strengths and weaknesses dependent on the form (taper characteristics) of the log it is being applied on. Two common formulas for calculating log volume in the UNECE region are the Smalian and Huber formulas (figure 1).

Figure 1: True log volume calculation



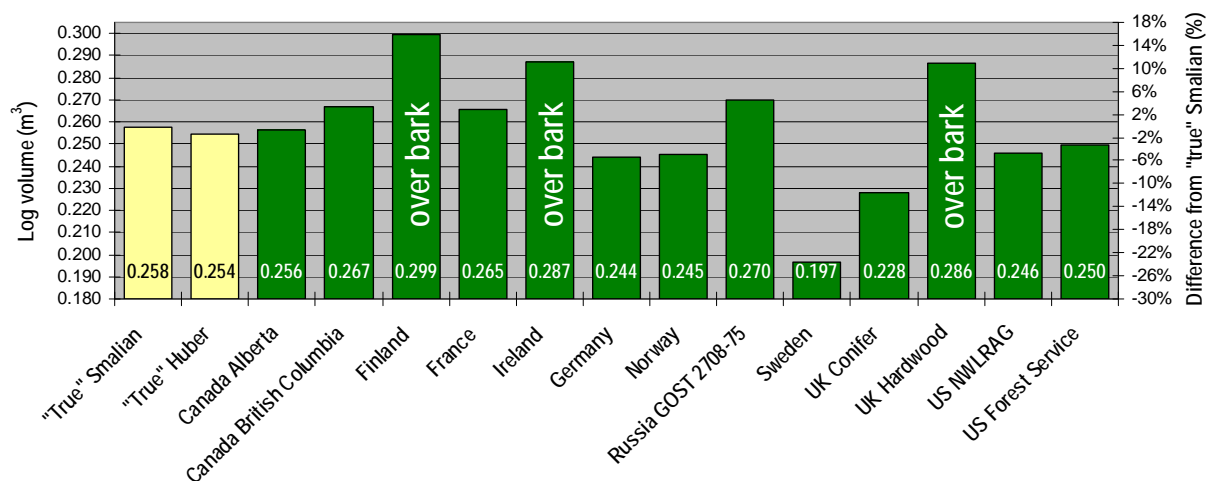
$$\text{Smalian formula: } \left(\left(\frac{23.2+22.7}{2} \right)^2 + \left(\frac{28.1+27.8}{2} \right)^2 \right) \times 5.02 \times 0.00003927 = 2.58 \text{ m}^3$$

$$\text{Huber formula: } \left(\frac{25.5+25.3}{2} \right)^2 \times 5.02 \times 0.00007854 = 2.54 \text{ m}^3$$

5. A significant issue, in terms of roundwood volume, appears to be the rounding conventions used for lengths and diameters, or stated more precisely, the common practice of truncating, which is to drop the decimals. This introduces bias by always rounding down decimals to whole numbers, e.g., 27.9 rounds to 27.0. Related to this, is the practice of specifying a certain amount of the length to be unmeasured in order to insure that the purchaser can, in principle, make products at least as long as the lineal length of the log, and ignoring this additional length for the calculation of volume, e.g., a log that is actually 5.1 metres in length has its volume calculated based on 5.0 metres of length. If one was to assume that a log has a mid-point diameter of 25.5 cm (this would be statistical average of diameters that fall between 25.0 and 25.99) and a length of 5.1 metres, the volume as calculated by unbiased rounding would be 0.260 m³, however, if one truncates the diameter to 25 cm and the length to 5.0 m the volume would be 0.245 m³ (5.8% less volume).

6. If the log shown in figure 1 has the volume calculated using the roundwood measurement procedures from 13 different national standards (chosen only because the standards were readily available), there is substantial variance in the volumes (figure 2). This may be quite different for logs with different attributes than is shown in figure 1, thus this is just a snapshot of one log and not statistically representative. However, the national standards that show the lower volumes in figure 1 are generally those that truncate diameters, lengths, or both.

Figure 2: Log volume comparison between national log scales for log in figure 1



Note: Calculated using the log dimensions in figure 1 and applying the procedures from the national roundwood measurement standards from the countries or organizations listed. NWLRAG = Northwest Log Rules Advisory Group, GOST 2708-75 is the standard for domestically consumed roundwood within the Russian Federation.

Source: See references under subsection on roundwood measurement standards (section 9) ECE/TIM/DP/49.

7. Procedural differences for handling defects in roundwood also contribute to this dilemma. For example, the reduction of volume for material that is viewed as being substandard as a result of defects (decay, fractures, crooked portions, etc.) vs. no reduction in volume, but a reduction in quality classification (grade).

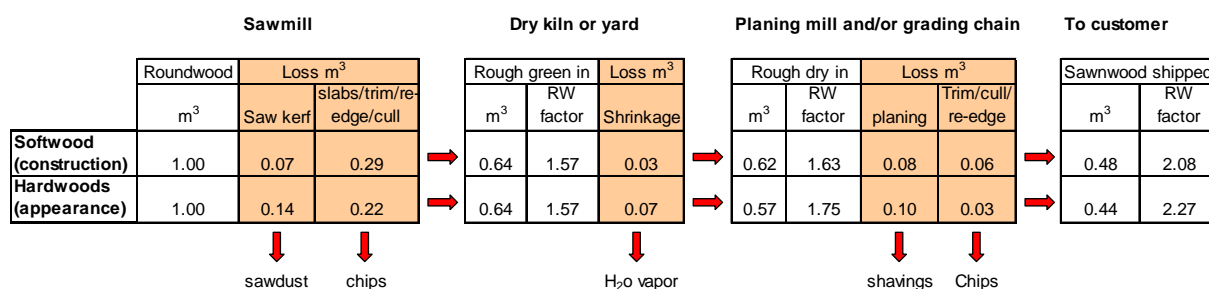
8. There is not enough data on this issue to attempt harmonizing reported roundwood volumes. It is known that differences exist; however, it is difficult to quantify this without first defining what standard to harmonize to, and secondly doing significant research.

III. Sawnwood

9. Sawnwood covers a large spectrum of products, from logs that are sliced longitudinally into green, semi processed flitches (boules) that have not been edged, dried, trimmed and planed into further processed sawnwood. One cubic metre of roundwood may produce 0.8 m³ of green flitches, which later may be dried, edged, trimmed and possibly planed into half that amount (0.4 m³) of finished sawnwood. The sawnwood production reported could be 0.8 m³ or it could be 0.4 m³ depending on the country or the manufacturing practices of the producer. In countries where flitches are commonly produced, they are often sold in boules (flitches banded together in a unit which resembles the original log that they were manufactured from). These are later remanufactured into sawnwood by the purchaser, who is often a secondary wood product manufacturer.

10. Even in countries and subregions where flitches are not produced or only make up a minor component of the sawnwood volume reported, there are other concerns related to state of manufacture that affect data harmonization for sawnwood. In many countries, sawnwood volume is calculated in the rough, green state of manufacture, which contrasts with the practices in other countries, where sawnwood volume is calculated in the fully dried and finished state. Typically a log is sawn in a mill into rough green sawnwood, it is dried by using a dry kiln or air drying, and finally is graded, trimmed (drying related and other defects removed) and possibly planed (figure 3).

Figure 3: Example of roundwood to sawnwood factors by state of manufacture



Source: UNECE/FAO, 2009.

11. Using figure 3 as an example, countries may report 0.64 m³ of sawnwood production per m³ of roundwood used if their practice is to report in the rough green state, or they may report 0.57 m³ if they report in the rough dry state (after shrinkage), or finally they may report 0.44 m³ in the fully finished (trimmed and surfaced state) (0.54 m³ if not planed). Based on the questionnaire data on coniferous sawnwood (ECE/TIM/DP/49), it would appear that Austria, Czech Republic, France, Germany, Ireland, Netherlands, and Spain report volume in the rough green state and were clustered at approximately 0.60 m³ of sawnwood per m³ of roundwood. Canada, Finland, Lithuania, Norway, Slovakia, Sweden, UK, and the US, report in what would appear to be a service-ready state (dried, grade trimmed and often planed) and were clustered at approximately 0.50 m³ of sawnwood per cubic metre of roundwood. While it can be argued that sawnwood can be measured in whatever state it is in, this leads to a certain level of incongruity when comparing production statistics and could lead to an imbalance if using the data for making a wood balance.

12. Related to the issue of “state of manufacture” is the issue of nominal sizing. This is where the size, and thus volume, of the product is carried over to another further processed state of manufacture. For example, sawnwood is sold in the retail market based on volumes determined by nominal sizes in some areas of Europe. For example: dried and planed sawnwood that is 45 mm x 95 mm, which might have started out at 50 mm x 100 mm prior to planing, will have its volume calculated and reported based on the latter, larger dimensions (50 mm x 100 mm).

13. Where the ratio of actual to nominal volume is established for sawn softwood, i.e., in North America, production statistics and conversion factors are adjusted to reflect actual volume. However, where they are not known, no adjustments are made. Currently, the nominal coniferous sawnwood production volumes from North America (Canada and the US) are converted by national correspondents from nominal to actual volumes by reducing the nominal figure by 28%. If this conversion was not done the coniferous sawnwood production from Canada and the US would increase from 90 billion m³ to 125 billion m³ (using 2008 production numbers). However, even if this unadjusted number is more congruous with sawnwood volumes from other subregions, it would not allow for an accurate wood balance (where all of the wood fibre is accounted for in its cascading uses). This is because it overstates actual wood fibre in the sawnwood component and conversely, may understate the substantial amount of wood fibre (in the form of chips, shavings and finger-jointing stock) that would re-enter the balance.

IV. Conclusions and next steps

14. Clearly, more information is needed in order to better harmonize roundwood and sawnwood production volume. All indications point to significant differences in national practices and thus misleading information being reported at the international level. Many of the members of the Forest Products Conversion Factor Task Force and country correspondents were unsure about measurement procedures at the initial data reporting level. Technical knowledge of these procedures, at the national level, would help in better understanding these differences. Moreover, many of the Task Force members commented that it was very difficult and sometimes impossible, to get information from the private sector forest product industries. This could be a result of concern regarding regulation or what they might see as intrusion into their business and transparency into their competitiveness.

15. Possible next steps for the Working Party to consider:

- a) Conduct further research on national procedures for roundwood and sawnwood measurement. Perhaps partner with other interested organizations, agencies, trade associations and private enterprises.
- b) Organize a meeting(s) with technical measurement experts. It may be helpful to hold the meeting with access to logs and sawnwood, whereby empirical data could be gathered for comparison purposes and harmonization factors. Again, it would seem logical to find partners with a mutual interest in this type of project.

16. *The secretariat requests the guidance of the Working Party on the following questions:*

- a) *Are the challenges of data harmonization of roundwood and sawnwood areas where we should seek more information in order to better harmonize data?*
- b) *If these harmonization matters are seen as an area where resources should be focused on, what should be the next steps?*