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# Determination of standards of raw timber natural losses due to shrinkage at long-term dry storage

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**Abstract:** The aim of the article is to describe the issue of determining the characteristics and parameters of raw timber natural losses due to shrinkage at long-term storage, defining the theoretical basis for creating standards, and verify its finding by means of a case study in raw timber storing. This issue is very topical in forestry practice in the Czech Republic as well as in other countries. The lower and upper limits of the standards were calculated, and the proposed mean value was grouped according to woody plants that reflected the most frequent commercial usage with respect to subsequent processing. Subsequently, experimental verification was carried out on a representative sample of 2 209.99 $m^3$ of raw timber of Norway spruce (*Picea abies* /L./ H. Karst.) at selected forest administrations. Furthermore, the article addresses the related accounting and tax issues of the standards of natural losses of raw timber. Currently, no legislation mandates an entity to establish standards.

**Keywords:** forestry; wood processing; economics; volume losses; natural loss standards; long-term storage; accounting; taxes

Although forestry economic research mainly focuses on the assessment of forests with respect to providing ecosystem services these days, the production function of forest and the sales of raw timber are still of great importance for forest owners (FAO 2010).

Therefore, the precise registration and valuation of one cubic metre of harvested raw wood are very important, especially in the context of the current processing of salvage felling and enormous stocks of raw spruce wood. Wood losses, both culpable and non-culpable, are a permanent concern of the forestry public as well as forest owners. The latest information can be found for example in Pecenka et al. (2020). Determination of the objective value of culpable losses is important for defying the liability for damage caused to forest owners or authorised owners of raw timber. Objective determination of the value of non-culpable (natural) losses or technological losses is important for forest owners, other entities with the proprietary right to raw timber in the commercial and consumer chain, and tax administration.

Losses up to the amount stipulated in the applicable standards are considered natural losses both abroad (Aziz 2015) and in the Czech Republic, namely pursuant to Section 25(2) of Act No. 586/1992 on Income Taxes with the latest amendments. Natural stock losses are incurred by objective causes and mainly result from physical properties of raw timber stock in the absence of human influences.

Although it is essential in the present situation of high logging and stock volumes, no qualified methodology for establishing standards for natural raw

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timber stock losses due to shrinkage at long-term storing is available to forest enterprises, businesses and wood-processing companies.

This paper aims to bring a more profound description of this issue, to establish the theoretical basis for creating standards for natural raw timber stock losses due to shrinkage at long-term storing, and to verify its findings by means of a case study in raw timber storing.

## MATERIAL AND METHODS

Time plays a significant role in storing the specific stock of biological origin. Biological assets are defined for instance in the IAS 41 International Accounting Standard (Herbohn, Herbohn 2006). Apart from the duration of storing, the annual period is also essential. For more information on natural loss standards for typical stock in the Czech Republic see e.g. Podhorský and Svobodová (2002) or Dušek (2018). The issue of deficits and damage in agricultural businesses was addressed by Morávek (2015).

**Related accounting and tax issues.** Regarding the related accounting and tax, this paper mainly builds on bibliography research in both domestic and foreign publications, accounting and tax legislation, and the authors' experience in the issue. From the global perspective, the paper proceeds from the IAS 2 and IAS 41 International Accounting Standards, the method by Mowen et al. (2012), who mainly focused on cost and management accounting, and articles by Aziz (2015), who dealt with material losses in cost accounting, available on the Internet.

From today's perspective and considering the territory of the Czech Republic, the accounting and tax regulations on deficit standards are even more critical. These mainly include Act No. 563/1991 on Accounting with the latest amendments (hereinafter referred to as the "ZoÚ") and the related implementing regulation – Decree No. 500/2002 on implementing certain provisions of Act No. 563/1991 on Accounting with the latest amendments, for entities representing businesses that use the system of double-entry accounting, and Czech Accounting Standards (hereinafter referred to as the "ČÚS") for business entities. The issues are mainly covered by Standards No. 015 and No.007. The ČÚS 015 (part 4.4.4.) stipulates that an entity may lay down standards of natural stock losses for the respective period.

The ČÚS 007 pays more attention to standards focusing mainly on the inventory difference and losses within the scope of the natural stock loss standards (part 2.2.). Part 3.2. thereof deals with specific accounting procedures. In the cases when a stock was purchased from other entities, the inventory differences and losses within the scope of natural stock losses shall debit the group of accounts No. 50 – Consumed purchases [ČÚS No. 007(3.2.1)a)]. If the losses within the scope of natural stock losses arise from own production, they shall debit the relevant accounts of group No. 58 – Change in stocks from own activities and capitalisation [ČÚS No. 007(3.2.2)a)].

The issue of inventory differences in stock and fixed assets and their accounting was also addressed by the Czech National Accounting Board, see the Interpretation I-39 approved on 15 April 2019 (Březinová, Vácha 2019).

As for the tax legislation, the most important regulation in the Czech Republic with respect to the natural loss standards is Act No. 586/1992 on Income Taxes with its latest amendments (hereinafter referred to as the "ZDP"). The natural loss standards are dealt with in Section 25 thereof. It stipulates the economically justified level for the natural loss standard and the shortage rate as well as that the tax administration may assess whether the level of the set standard reflects the character of the taxpayer's activity and the usual level for standards of other taxpayers with the same or similar activity (Section 25 of the ZDP).

The Income Tax Act does not stipulate any rules for the preparation of natural loss standards. There is no regulation obliging an entity to create the standard in question either. Nevertheless, if a business operator carries out an activity from which natural losses arise, it is in their interest to lay down such standards. Of the regulations which addressed this issue before the year 1989, it is particularly worth noting Decree No. 210/1954 of the Ministry of Internal Trade, which stipulated the standards of deficits arising from non-culpable loss of solid compacted fuels and fuelwood, and Decree No. 189/1964 of the Ministry of Internal Trade on standards of non-culpable deficits in internal trade organisations.

**Physical properties of wood.** Moisture characteristics of wood belong to the basic physical characteristics of wood. Wood is a hygroscopic material in relation to its surroundings. It is capable of ab-

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sorbing or releasing water, which is the most relevant of liquids and gases from the practical point of view. Upon logging, the water content in wood changes based on the duration and method of storing and further use. Thanks to its hygroscopicity, however, wood always contains some water. Based on its distribution in wood, it can be divided into chemically bound water, bound (hygroscopic) water, and free (capillary) water. The chemically bound water is of practically no importance for the determination of the physical and mechanical properties of wood. The modelling of moisture movement in wood during outdoor storage was dealt with e.g. by Baronas et al. (2001).

According to various authors (Matyáš 1962; Skaar 1988; Pischedda 2004; Redman et al. 2016), the main external factors influencing humidity changes are weather conditions, type of wood, conditions, shape and dimensions of wood.

The most appropriate method of determining the boundary between bound and free water is to determine the hygroscopicity limit (*HL*), i.e. the equilibrium moisture reached by wood subjected to long-term exposure to the environment with the relative humidity close to saturation (φ = 0.995%). The hygroscopicity limits of various wood types were adjusted by Matovič (1993) based on Trendelenburg and Mayer-Wegelin (1955).

Since wood is a hygroscopic material capable of changing its moisture content according to the ambient humidity, the equilibrium wood moisture (*EWM*) represents another quantity important for the issue. The state achieved thereby is known as the moisture equilibrium (*ME*). The *EWM* is moisture content which stabilizes at certain ambient conditions (relative air humidity and temperature). Consequently, the *EWM* changes with every change in the relative air humidity and temperature. If the wood moisture is lower than the *ME*, the wood absorbs water in the form of water vapour from the ambient air until it reaches the *ME*. Wood moisture higher than the *ME* leads to the opposite process – desorption (Gandelová et al. 2009; Engelulnd et al. 2013).

The function of *EWM* and relative air humidity at a constant temperature is known as the sorption isotherm. The difference in sorption isotherms at adsorption and desorption is called sorption hysteresis and is relatively constant for the range of relative air humidities (φ) of 10–90%, with the sorption oscillating within the *EWM* range of 15–22% (Kollmann, Côté 1968). For more information on the differences in the measurement of raw wood see Janák (2007a, b); Janák and Ondráček (2006); Fonseca (2005); Janák et al. (2005); Miklašēvičs (2013); FAO, ITTO and United Nations (2020).

**Swelling and shrinkage of wood.** Swelling (α) is the ability of wood to increase its linear dimensions, surface area, or volume with the absorption of bound water within the range of 0%–*HL*. Shrinkage (β) is the process of decreasing the linear dimensions, surface area, or volume due to the loss of bound water.

Based on the general knowledge of physical properties of wood and the theory of swelling and shrinkage of wood, the following procedure can be used to lay down standards of natural losses in raw timber due to shrinkage at long-term storing:

(1) For the sake of simplicity, a linear function of the change in volume and change in moisture can be assumed. This function is non-linear (sigmoid), but the linear function is sufficient for general purposes.
(2) Each woody plant species has a different slope of this function due to its structure and density. It is usually expressed as the volumetric shrinkage coefficient ($K_{\beta v}$) (%·%$^{-1}$), showing by what percentage the volume changes if the wood moisture content changes by 1%. The specific value depends on the basic density, which is the ratio of the weight of dried wood and the wet volume.
(3) Wood shrinks only if the wood moisture content is below the so-called saturation limit of the cell walls, or the used hygroscopicity limit (*HL*).
(4) The last variable is the *EWM*, which wood achieves in case of long-term drying in log dump or standing, supposedly longer than 6 months. Usually, the value of 15–22% is quoted, though for barked wood or saw timber (Kollmann, Côté 1968). A similar value of *EWM* is given in publications by Engelund et al. (2013) and Willems (2016).

Theoretically, the Equation (1) for the calculation of standards of raw timber natural losses due to shrinkage at long-term storage $\Delta\beta_v$ can be as follows:

$$\Delta\beta_v = K_{\beta v} \times \Delta W \quad (1)$$

where:

$K_{\beta v}$ – volumetric shrinkage coefficient;
*HL* – hygroscopic limit;
*EWM* – equilibrium wood moisture;
$\Delta W = HL - EWM$.

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**Experimental verification.** Experimental verification of the theoretical calculation of the upper and lower boundary of the range of values for standards of raw timber natural losses due to shrinkage at long-term storage was carried out on a representative sample of 2 209.99 $m^3$ of raw timber of Norway spruce (*Picea abies* /L./ H. Karst.), with the volume divided based on the technological use: 750.21 $m^3$ (40.56%) of industrial coniferous logs for mechanical sawmill processing (ICL), and 1 099.63 $m^3$ (59.44%) of coniferous pulpwood for the pulp and paper industry (PW). The provided data are as of the date of entry into storage; November 2018–January 2019. Fresh bark beetle wood from salvage cutting in the fourth quarter of 2018 was stored. According to data from the Czech Hydrometeorological Institute (CHMI 2020), 2019 was above average for rainfall. The long-term normal of total rainfall (1981–2010) in the South Moravian Region is 559 mm. The total rainfall in 2019 in the South Moravian Region was 728 mm. In 2019, the total rainfall in the South Moravian Region was 105% of the normal in the Czech Republic.

The total raw timber stock was 486 802 $m^3$ of five forest administrations of the state enterprise Lesy České republiky as of the balance sheet date of 31 December 2019.

In relative terms, the sample accounts for 0.38% of the total raw timber stock of five forest administrations of the state enterprise Lesy České republiky as of the balance sheet date of 31 December 2019, which had been stored without stock movement for 10–12 months at the date of the second control measurement. This is a simple random sample from the base set, as the base set is homogeneous. Each base file drive has the same option to be selected (Hindls et al. 1999). The choice of the sample is an example respecting the procedures of inventory according to Act No. 563/1991 on Accounting with the latest amendments. The first control measurement was carried out at the date of entry into storage, and the second control measurement was carried out at the regular stocktaking.

The measurement was performed physically by means of measuring timber in stacks using the procedure described in Chapter 7 of the Recommended Rules for Measurement and Categorization of Wood in the Czech Republic (2008). To ensure unified outputs, only the stock with the production length of the individual pieces of 4 m was used while applying the reduction factor from a stacked cubic meter (PRM) to a cubic meter ($m^3$) of 0.64.

## RESULTS

Tables 1–3 show the calculations from the theoretical part of this paper and establish the potential range between the upper and lower limit as well as the proposed mean value of the relative terms of standards of raw timber natural losses due to shrinkage. The calculations disregard the quality categorization based on the raw timber product range, quantitative parameters (length, diameter), storage duration, and storage method.

The calculations for the upper and lower limits for standards and proposed mean values are grouped according to woody plants that reflect the most frequent commercial usage with respect to subsequent processing.

Tables 4–7 show the measurements and calculations based on the experimental verification carried out at the regular annual stocktaking of raw timber stock in October and November 2019 at the forest administrations of Černá Hora, Náměšť nad Oslavou, and Znojmo.

The thickness structure of stored wood is 20–38 cm small end without bark for ICL, and 12–19 cm small end without bark for PW.

The relatively high difference in stack No. 43 has not been verified in detail. It may be due to the weaker thickness structure of the wood stored in this stack, 20–29 cm small end without bark.

## DISCUSSION

Based on the analysis of the available documents, there is no specific regulation or guideline in either the Czech Republic (mainly in ZoÚ; ČÚS; ZDP; Procházka 1972; Morávek 2015; Dušek 2018) or abroad (Herbohn, Herbohn 2006; Aziz 2015; Pecenka et al. 2020) which would specifically stipulate the method for establishing standards of natural losses of individual biological assets, including timber, and the method of keeping a record of items of cost or management accounting (Mowen et al. 2012; Aziz 2015).

All publications recommend entities to lay down their own internal rules which should stipulate the standard natural loss for the given entity based on their experience and considering the character of their activities and the usual level of the standard of their competitors. Consequently, the tax administration shall assess the methods individually based on the specific conditions of the given entity.

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Table 1. Calculation of the limit difference in *HL* and *EWM*

| Wood type groups | *HL* mean value | *EWM* mean value range | | Δ*W* range | |
|---|---|---|---|---|---|
| | (%) | | | | |
| Heartwood of conifers with high resin content: pine, larch, white pine, limba | 23.0 | 15.0 | 22.0 | 8.0 | 1.0 |
| Heartwood of broad-leaf species with ring- and semiring-porous wood structure: robinia, chestnut, oak, ash, walnut, cherry | 24.0 | 15.0 | 22.0 | 9.0 | 2.0 |
| Heartwood of conifers with lower resin content: Douglas fir | 27.0 | 15.0 | 22.0 | 12.0 | 5.0 |
| Coniferous wood with sapwood and ripewood: spruce, fir | 32.0 | 15.0 | 22.0 | 17.0 | 10.0 |
| Broad-leaf wood with diffuse-porous wood structure: willow, poplar, linden, alder, birch, beech, hornbeam | 33.5 | 15.0 | 22.0 | 18.5 | 11.5 |

Source: Trendelenburg and Mayer-Wegelin (1955), adjusted according to Matovič (1993); *HL* – hygroscopicity limit; *EWM* – equilibrium wood moisture; Δ*W* – hygroscopic limit – equilibrium wood moisture

Table 2. Calculation of the lower and upper limit for standards of raw timber natural losses; storage time of 6 months and longer.

| Woody plant group | $\Delta\beta_v$ range | | $K_{\beta v}$ | ΔW range | |
|---|---|---|---|---|---|
| | | | (%) | | |
| Spruce, fir | 4.3 | 7.3 | 0.43 | 10.0 | 17.0 |
| Pine, white pine, limba | 0.4 | 3.5 | 0.44 | 1.0 | 8.0 |
| Douglas fir | 2.2 | 5.3 | 0.44 | 5.0 | 12.0 |
| Larch | 0.5 | 4.2 | 0.52 | 1.0 | 8.0 |
| Oak, robinia, walnut, cherry, chestnut | 0.9 | 3.9 | 0.43 | 2.0 | 9.0 |
| Ash | 0.9 | 4.1 | 0.45 | 2.0 | 9.0 |
| Beech, hornbeam, linden, alder | 5.4 | 8.7 | 0.47 | 11.5 | 18.5 |
| Birch | 6.2 | 10.0 | 0.54 | 11.5 | 18.5 |
| Aspen | 4.7 | 7.6 | 0.41 | 11.5 | 18.5 |

Source: Ugolev (1975); $\Delta\beta_v$ – standard of natural losses; $K_{\beta v}$ – volumetric shrinkage coefficient; Δ*W* – hygroscopic limit – equilibrium wood moisture

Table 3. Standard of raw timber natural losses due to shrinkage at long-term storing; storage time of 6 months and longer

| Woody plant group | Standard of natural losses $\Delta\beta_v$ (%) | | |
|---|---|---|---|
| | range | | mean value |
| Spruce, fir | 4.3 | 7.3 | 5.80 |
| Pine, white pine, limba | 0.4 | 3.5 | 1.95 |
| Douglas fir | 2.2 | 5.3 | 3.75 |
| Larch | 0.5 | 4.2 | 2.35 |
| Oak, robinia, walnut, cherry, chestnut | 0.9 | 3.9 | 2.40 |
| Ash | 0.9 | 4.1 | 2.50 |
| Beech, hornbeam, linden, alder | 5.4 | 8.7 | 7.05 |
| Birch | 6.2 | 10.0 | 8.10 |
| Aspen | 4.7 | 7.6 | 6.15 |

$\Delta\beta_v$ – standard of natural losses

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Table 4. Measurement results from the forest administration of Černá Hora

| Date of stock entry and 1st measurement: 1/2019<br>Date of 2nd measurement: 11/2019; stock age in months: 11 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Stack No. | product range | woody plant | length (m) | coefficient (PRM·m$^{-3}$) | 1st measurement | | 2nd measurement | | measurement difference | |
| | | | | | (PRM) | (m$^3$) | (PRM) | (m$^3$) | (m$^3$) | relative (%) |
| 18 | | | | | 107.40 | 68.74 | 105.68 | 67.64 | –1.10 | –1.60 |
| 174 | ICL | spruce | 4 | 0.64 | 54.87 | 35.12 | 53.52 | 34.25 | –0.86 | –2.46 |
| 175 | | | | | 62.23 | 39.83 | 60.88 | 38.96 | –0.86 | –2.17 |
| 26 | | | | | 244.32 | 156.36 | 236.08 | 151.09 | –5.27 | –3.37 |
| 31 | PW | spruce | 4 | 0.64 | 175.48 | 112.31 | 169.52 | 108.49 | –3.81 | –3.40 |
| 173 | | | | | 215.24 | 137.75 | 206.36 | 132.07 | –5.68 | –4.13 |
| Average volumetric difference | | | | | | | | | –17.60 | –3.20 |
| of that for ICL assortment | | | | | | | | | –2.83 | –1.97 |
| of that for PW assortment | | | | | | | | | –14.77 | –3.63 |

PRM – stacked cubic meter; ICL – industrial coniferous logs for mechanical sawmill processing; PW – coniferous pulpwood for the pulp and paper industry

Table 5. Measurement results from the forest administration of Náměšť nad Oslavou

| Date of stock entry and 1st measurement: 1/2019<br>Date of 2nd measurement: 11/2019; stock age in months: 10 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Stack No. | product range | woody plant | length (m) | coefficient (PRM·m$^{-3}$) | 1st measurement | | 2nd measurement | | measurement difference | |
| | | | | | (PRM) | (m$^3$) | (PRM) | (m$^3$) | (m$^3$) | relative (%) |
| 25 | | | | | 388.66 | 248.74 | 377.88 | 241.84 | –6.90 | –2.77 |
| 37 | ICL | spruce | 4 | 0.64 | 404.48 | 258.87 | 396.56 | 253.80 | –5.07 | –1.96 |
| 43 | | | | | 99.05 | 63.39 | 91.88 | 58.80 | –4.59 | –7.24 |
| 95 | | | | | 55.52 | 35.53 | 54.92 | 35.15 | –0.38 | –1.08 |
| 1 | PW | spruce | 4 | 0.64 | 346.52 | 221.77 | 338.69 | 216.76 | –5.01 | –2.26 |
| 14 | | | | | 135.92 | 86.99 | 133.31 | 85.32 | –1.67 | –1.92 |
| Average volumetric difference | | | | | | | | | –33.64 | –2.64 |
| of that for ICL assortment | | | | | | | | | –16.94 | –2.79 |
| of that for PW assortment | | | | | | | | | –16.70 | –2.50 |

PRM – stacked cubic meter; ICL – industrial coniferous logs for mechanical sawmill processing; PW – coniferous pulpwood for the pulp and paper industry

This, then, are some recommendations based on the experience of the individual authors and entrenched practice.

As early as in 1972, the Ministry of Agriculture and Nutrition of the Czechoslovak Socialist Republic presented recommended standards of deficits, known as "Listovka" (Procházka 1972), as an aid for the formation of internal directives. It mentioned (Procházka 1972) that losses of biological stock which arose from natural loss in amount or change in the quality of stocks in storage were determined by a percentage of the set material basis and deficit standards were established to cover the natural and non-culpable losses originating, among others, from long-term storage (drying out, evaporation, rotting, degradation, etc.).

The values of the experimental verification results of the theoretical calculation of standards of non-culpable raw wood losses due to long-term storage ($\Delta\beta_v$ %) performed on a representative sample of

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Table 6. Measurement results from the forest administration of Znojmo

| Date of stock entry and 1st measurement: 11/2018<br>Date of 2nd measurement: 11/2019; stock age in months: 12 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Stack No. | product range | woody plant | length (m) | coefficient (PRM·m$^{-3}$) | 1st measurement | | 2nd measurement | | measurement difference | |
| | | | | | (PRM) | (m$^3$) | (PRM) | (m$^3$) | (m$^3$) | relative (%) |
| 34 | | | | | 150.87 | 96.56 | 142.41 | 91.14 | –5.41 | –5.61 |
| 75 | PW | spruce | 4 | 0.64 | 253.39 | 162.17 | 246.22 | 157.58 | –4.59 | –2.83 |
| 939 | | | | | 196.44 | 125.72 | 193.00 | 123.52 | –2.20 | –1.75 |
| Average volumetric difference | | | | | | | | | –12.20 | –3.17 |
| of that for ICL assortment | | | | | | | | | – | – |
| of that for PW assortment | | | | | | | | | –12.20 | –3.17 |

PRM – stacked cubic meter; ICL – industrial coniferous logs for mechanical sawmill processing; PW – coniferous pulpwood for the pulp and paper industry

Table 7. Summary of measurement results; storage time of 10 months and longer

| Assortment | Σ 1st measurement (m$^3$) | Σ 2nd measurement (m$^3$) | Measurement difference | |
|---|---|---|---|---|
| | | | (m$^3$) | relative (%) |
| Saw log | 750.21 | 730.44 | –19.77 | –2.64 |
| Pulpwood | 1 099.63 | 1 065.97 | –33.66 | –3.06 |
| Total | 1 849.85 | 1 796.41 | –53.44 | –2.89 |

1 849.85 m$^3$ of Norway spruce raw wood (Tables 4–7) are below the lower limit of the theoretical calculation, $\Delta\beta_{v(\min)}$ = 4.3 % (Table 3). The experimentally measured relative value of the non-culpable losses due to storage for a period of 10 months and longer is –2.64% with the timber assortments for mechanical sawmill processing (ICL), and –3.06% with the timber assortment for the paper and pulp industry. The factors essential for a correct setting of standards of non-culpable raw wood losses due to long-term storage can be defined as follows:

– Woody plant species and the storage period;
– Quality timber assortment and length of pieces;
– Thickness structure of stored wood;
– Landing location (forest, dispatching centre, exposure to full sunlight, shade);
– Total rainfall during storage;
– Measurement procedure at the first reception to storage.

By respecting the suggested factors of the proper setting of business procedures of laying down standards of non-culpable raw wood stock losses, the general recommendations from papers on this issue (Aziz 2015; Dušek 2018; Březinová et al. 2019) are accepted.

It follows from the accounting rules that an entity should lay down internal rules for:

(1) Selected (item-based) types of stock to which the standards do not apply;
(2) The level of the natural losses (as a percentage) for the individual stock items;
(3) The purpose of the stipulated standards, in this case of the standard of natural losses due to shrinkage at long-term storage;
(4) Conditions on which the loss standards may be applied;
(5) The basis from which the total loss is calculated;
(6) The method for the calculation of the loss for standards;
(7) Cases to which the loss standard does not apply.

The principles stipulated in Annex No. 6 to Decree No. 403/2000 with the latest amendments can be used to set the procedure and method of the measurement of samples of the stored wood basis from which the overall loss is then calculated.

The formation of the standard of losses must be based on the correct stock record and inventory results, which is also stressed in the above-mentioned Decree No. 210/1954 of the Ministry of Internal Trade. At the same time, it is necessary to observe

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the actual losses for a certain period with respect to their nature. An entity shall carefully observe and record the natural loss due to spray, shrinkage, etc. and regularly weigh, measure and control a certain amount of stock and keep records thereof, which can be used to determine the cause of the losses.

If the financial administration could be consulted concerning an internal directive upon its creation and potential disagreement could be discussed, there would be fewer irregularities. The problem is that if there is a need to assess the set standards stipulated in and required by Section 25(2) of the ZDP, the institute of a binding assessment by the tax administration pursuant to Section 132 of the tax law (Act No. 280/2009) cannot be used. According to Dušek (2018), this is possible only in the cases mentioned in the tax law, i.e. there are seven such cases according to the and 3 cases according to other acts, i.e. not in the case of natural stock losses. However, it can be said that since the value of natural losses is accounted as a cost and hence it is included in the product price in advance, it cannot be seen as a tax error from the perspective of tax laws.

Pursuant to Section 25(2), the tax administration shall assess whether the level of the set standard reflects the character of the taxpayer's activity and the usual level of the standard of other taxpayers with the same or similar activity, and correct the tax base with the found discrepancy. The taxpayer shall get economically justified standards for tax eligibility.

## CONCLUSION

The definition of natural loss standards is a rather complex issue since the final evaluation of their acceptability and level depends on the tax administration. The entity – the taxpayer – must provide an economic justification of the standard level during the tax assessment procedure, and provide them with evidence proving the acceptability and accuracy of the set standard. If the appropriate theoretical basis and precise records are provided, a justification of the standard to the tax administration will be much easier. It is, therefore, vital to pay attention to this matter.

The creation of loss standards shall proceed from a correct and continually kept stock record and inventory results. The calculation of the standard shall be performed based on stocks and organisational units of the enterprise, and the actual losses shall be monitored with respect to their nature. The established differences cannot be compensated within the enterprise. Every organisational unit processes the calculations based on its needs. The applied level of natural losses is proved within the stock-taking, whereas the established difference exceeding the upper theoretical limit for each woody plant shall be further analysed and proved.

The different approaches among forest or timber owners to the issues of raw timber natural losses at its long-term storage are yet more visible in the context of the current situation in forests, especially with respect to a correct calculation, accounting, and taxation. Since there is neither method nor legal regulation and the approach of tax administrations is incoherent, there is an urgent need to discuss the matter and lay down a single methodical procedure. The findings of this paper shall become a practical contribution for forest owners and accounting in the forest or other enterprises.

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