

Minutes StanForD2010

2014-04-09

Place:	Phone meeting, 10:00-16:00 CET
Participants:	Tapio Räsänen, Metsäteho Lars Henriksson, SDC Mikael Eliasson, LogMax Erik Kindlund, John Deere Antti Korkiakoski, John Deere Björn Urbanke, KWF Urban Folkesson, Ponsse Joakim Nygren, Haglöf Maria Nordström, Skogforsk Björn Hannrup, Skogforsk Niclas Eriksson, Komatsu Forest (phone) Fredrik Tjernberg, Komatsu Forest (phone) Jonas Thorsson, Dasa (phone) Jean Plamondon FP Innovations (phone) Pasi Palonen, Parker (phone) Teemu Paldanius, Ponsse (phone) Juha Yli-Hemminki, Logset (phone) John Arlinger, Secretary Johan J. Möller, Chairman

§ 1 Opening of meeting

Johan J Möller opened the meeting..

§ 2 Agenda

The agenda was accepted by the meeting.

§ 3 Information about decisions after last meeting (minutes 2013-11-07)

Following updates were carried out after the phone meeting 2013-12-12:

- Added following text ““Mid diameter” is measured at a position defined according to VolumeLengthCategory.” into description of VolumeDiameterCategory element in PriceDefinitionType
- Added a new complex type GermanDistanceBased and corresponding element to BarkFunctionType
- Added a new BarkDeductionDistanceType with two attributes distanceClassLowerLimit and dBHClassLowerLimit
- Added a new enumeration “GermanDistanceBased” to BarkFunctionCategoryType
- Added a new attribute tableTriggerPoint in DataTableDefinition (Udi) with enumerations: StartObject, EndObject, EndShift, UnloadingComplete and ChangeSubObject StartShift and ChangeObject

§ 4 New Lithuanian bark function

Anders Nylund, Komatsu proposed a new Lithuanian bark function as described in appendix 1.

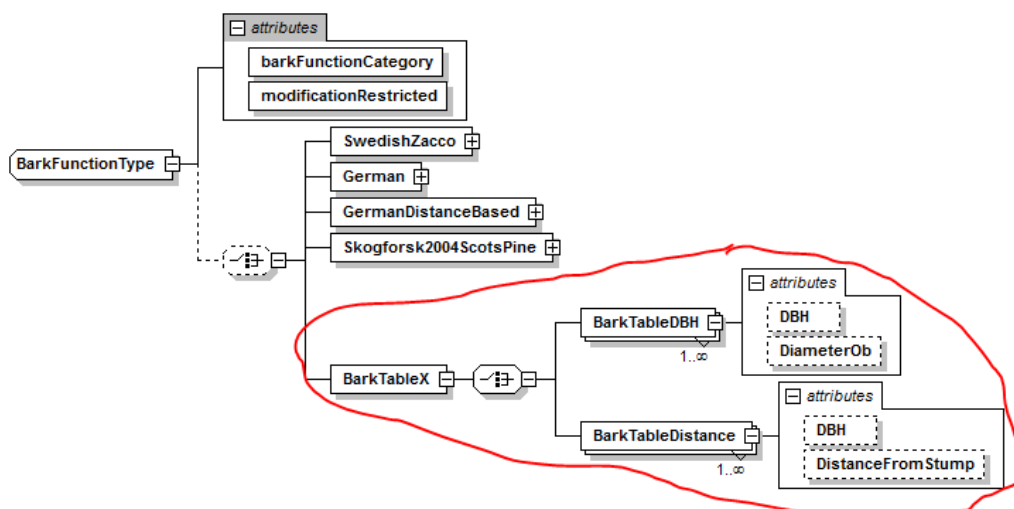
All manufacturers expressed that they would prefer to find a more general solution that is independent of what type of equation is used. This means that we would not be forced to update the standard each time there are new requirements on a specific market. No manufacturer expressed that they would have any significant problems in using a table for registering double bark thickness.

Skogforsk will analyse:

- whether the Lithuanian bark equation is suitable for Swedish species such as birch, aspen and lodge-pole pine.
- the possibility to use a table instead of function
 - Possibility to set the independent variables for the table dynamically (e.g. diameter on bark vs. DBH or diameter on bark vs. height from stump).
 - Linear interpolation between each class in the table.

	Diameter on bark, mm (or Height, cm)										
DBH, mm	50	51	52	53	54	55	56	57	58	59	
1											
2											
3											
4											
...											

The table might be registered according to the following schema example:



A bark thickness matrix will most certainly be of significant size. There might be as many as 6 000 000 values included in case one diameter class per mm (0-1000 mm) and one length class per cm (0-6000 cm) is deemed necessary. The number of values would of course decrease if we used the diameter unit cm and length unit dm. However, this probably would mean that some kind of interpolation method must be defined and implemented in order to avoid threshold effects.

A new table for bark deductions could be included in version 3.1 but the older bark functions cannot be excluded until version 4.0.

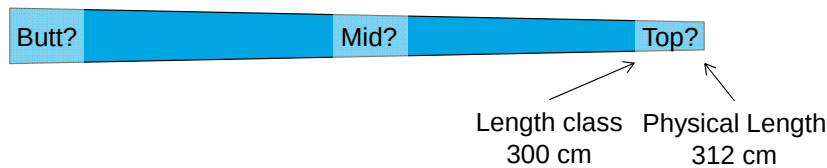
§ 5 Price volume and log lengths (appendix 3)

Skogforsk proposal 2014-03-27.

It is not uncommon in Sweden that you find apt-files where the price volume is "solid volume under bark" (var161_t1 = code 2) for saw logs and where the price length is set to "Length class" (var163_t1 = code 1). It is not known by Skogforsk how this kind of price volume is calculated in case of having a length margin or cutting window.

It is known by Skogforsk that at least one manufacturer excludes the top part of the log (above length class). Skogforsk would therefore like to know how this kind of price volume is calculated by the different manufacturers in order to suggest a recommendation.

The figure below illustrates this problem in a case where the length class is 300 cm but the physical length is 312 cm. What “12 cm module” is excluded?



All manufacturers stated during the meeting that they all handle this situation by excluding the top part of log (above length class) from the registered “m3(price)-volume.”

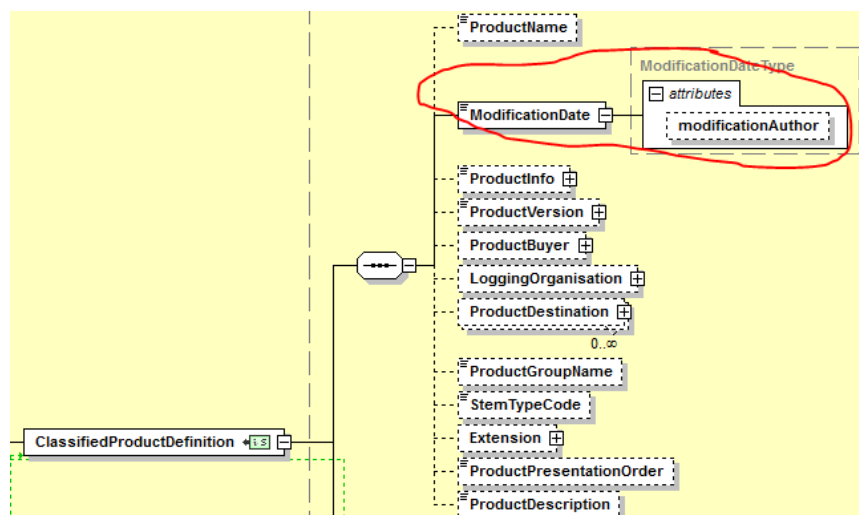
Another related issue is how the volume type m3sub or m3sob in hpr/hqc/thp/mom is calculated if element VolumeLengthCategory is not equal to “Physical length cm”.

It was decided that the volume categories “m3sub” or “m3sob” must be based on the physical length of the log. This is to be specified in the annotation of LogVolumeCategory

§ 6 ModificationDate in ProductDefintion

Each product must have an element ModificationDate with the following definition:

Date and time when product definition was last modified. ProductKey updated if modified in machine. Not to be updated if ProductKey is updated only because SpecieGroupDefinition was modified and new SpeciesGroupKey was updated. Time stamp must have the following times registered: local time $\pm$ offset from UTC.



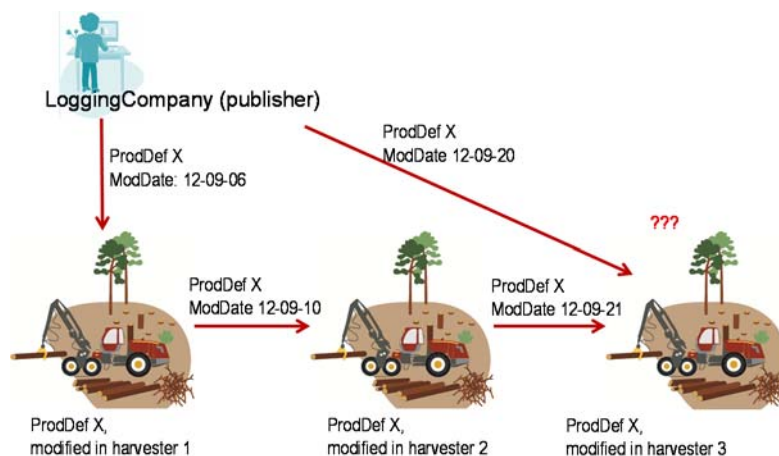
ADMINISTRATING PIN- AND SPI-FILES

Open and read product instruction (pin) or species group instruction (spi). Do the following checks for all products in a new pin-file:

- 1) Check if new UserId is unique.
 - a) Add to product database if unique and set new unique Key
 - b) Available = true
- 2) Check if UserId and ModificationDate already exist.
 - a) Do not add to product database
- 3) Check if UserId with different ModificationDate exist.
 Ask user whether new product should replace old product.
 If answer is OK then add new Product, set new Key
 - a) Available = true for new Product
 - b) Available = false for old Product

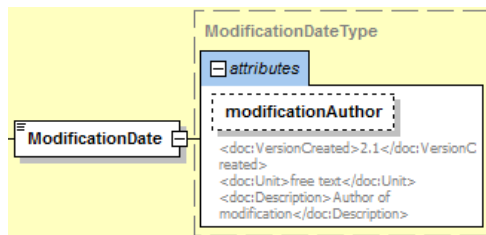
ModificationDate must always be updated if any modifications to ProductDefinition are carried out. No automatic update of *ProductDefinition* at ongoing site should be implemented; operator must have possibility to deny an updated product.

The structures mean that a ProductDefinition could be sent to a harvester and then modified in that harvester or another harvester several times. This case could be described in the following figure:



The only thing stated clearly is that if both ProductUserID and ModificationDate are the same there is no need at all for updating the “product database” in the harvester. The operator must always have the final decision when one product in the “database” is to be replaced even if the product in the machine is younger than the new one sent to the machine.

By using an optional free text attribute (ModificationAuthor), where it is stated who did the last modification, it is possible to inform the operator not only about when the product was last modified but also the author of these changes.



The operator could for example get the following question when importing a new product definition:

"Do you want to replace present product "Pine small sized timber" with product "Pine small sized timber"?"

The present version was modified by "Holmen skog" at 2012-09-20 12:15:02.

The imported version was modified by "MaxiXplorer 941.1" at 2012-09-21 09:27:39.

NEW SUGGESTIONS REGARDING USE OF MODIFICATIONDATE

When studying the present use of ModificationDate (spring of 2014) it has been noted that it is almost always updated immediately when taken into use in harvesters. This may be caused by several different reasons such as the operator adjusting the ColorMatrix or adjusting quality setting in order to manage different control buttons. These adjustments may in many cases not affect the bucking results at all.

The fact that ModificationDate is updated in the machine almost always when it is received might be problematic if the logging organization always sends out all products to the harvester even if these products have already been sent out previously. This would be a very common situation if an env-file is generated for each individual harvesting object.

An idea raised by Jörgen was to implement a separate element ModificationDateMachine that is only to be used by the forest machine. ModificationDate would then only be used by the administrative system (meaning all systems except forest machines). This would make it simpler for machine system to determine if a product received from the logging organization really is a new product or not.

A consequence of this proposal would be that the definition of element ModificationDate has to be changed in order to point out that it is never to be updated in the machine if ModificationDateMachine is used. It means that ModificationDate is updated in administrative systems while only ModificationDateMachine is updated in the forest machine if anything is modified in the ProductDefinition.

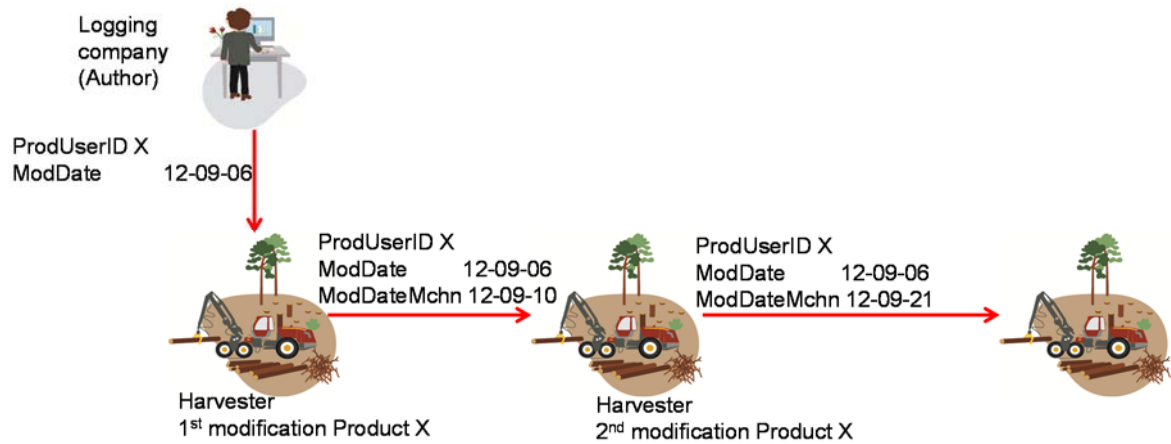
These new elements, definitions and rules should apply also to Objects, SpeciesGroups, Locations, Destinations etc.

Attribute modificationAuthor was added with version 2.1 in order to include free-text information indicating whether a certain product (pin-file) came from an administrative system or if it had been modified in a machine (described above).

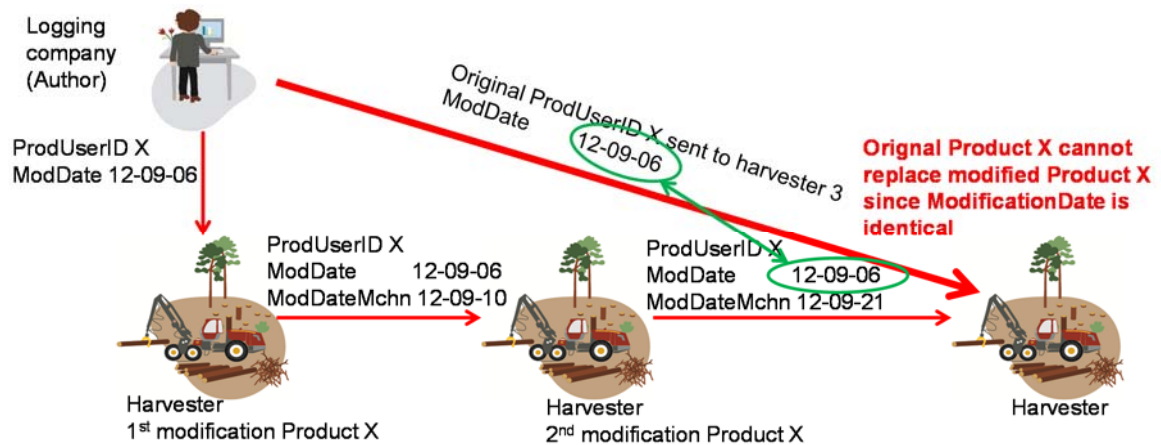
Additional comment from secretary

The proposal of adding a ModificationDateMachine might have some problematic consequences as illustrated below. However, whether these changes are of importance is something that can be discussed.

Let us assume that a pin-file with product X is sent out to a harvester. The same product is then modified twice as illustrated below:



It is then discovered by the logging company that the harvester is using a product X that has been significantly modified from their point of view. The logging company therefore sends the original pin-file with product X directly to the harvester as illustrated below:



If we still have the rule that we never overwrite one product with another product if UserID and ModificationDate are identical it will not be possible for harvester to use the original product X sent directly from the logging company. The operator would in this case, have to manually delete the existing product X in order to activate the original product X sent from the logging company.

DISCUSSIONS AT MEETING

Several of the meeting participants were quite hesitant about this proposal due to the fact that it has not been found to be a significant problem as of present. If we

are to change one of the very basic rules of the standard it must solve a real existing problem.

Skogforsk will analyse what settings are normally changed in the harvester when receiving a new product. A possible solution could be to allow some limited modifications without updating ModificationDate.

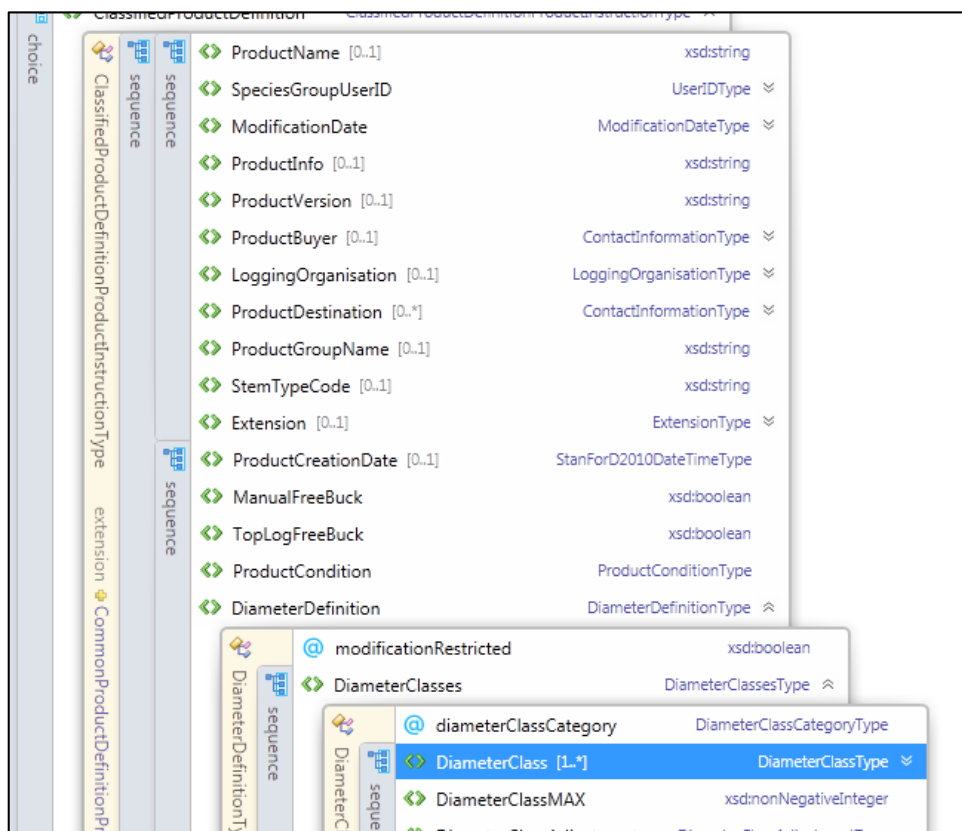
It could also possible for manufacturers to test this concept by adding an extension-element where the original ModificationDate from the administrative application is stored. This date could be used in the machine when comparing new pin with the existing pin in order to indicate to operator whether or not the new pin is really a new.

§ 7 No DiameterClasses in pin

Proposal from Fredrik Tjernberg, Komatsu (2014-03-04).

Fredrik noted that it is not possible to include a product without length and diameter classes when he analysed an error in an hpr-file. This is due to the fact that DiameterDefinition and LengthDefinition are both mandatory. This means that it is not possible to use pin-format for communicating incomplete products, for example between two different administrative applications.

If this is to be possible we have to make these two element optional, means going from [1..*] to [0..*] .



Comments from secretary

I am a little bit hesitant about having DiameterDefinition and LengthDefinition optional since it would make the schema validation of pin, hpr, hqc and thp much weaker. I would then prefer to have separate schemas for administrative tools or to have an in-official agreement that you are allowed to work with incomplete messages in these cases.

DISCUSSION AT MEETING

It was stated by several of the meeting participants that they would prefer not to weaken the schema validation in order to avoid a situation where administrative applications must increase the number of separate application validation controls.

The meeting decided to postpone this issue.

§ 8 Harvester test issues (appendix 5)

SUBOBJECTS EXCLUDED FROM OIN FILE.

Several manufacturers have had problems with oin-files that do not include any SubObject. It is recommended that this situation must be possible to handle in a simple way in the forest machine. It is also suggested that the operator is notified about the fact that no SubObject has been included in order to have the possibility to manually create a SubObject from the start of harvesting. This is especially important if you have a situation where it is possible to start a new sub-object during an ongoing object with already harvested stems. It will then be a situation where some of the stems have a sub-object number and some not.

The following descriptions of how a sub-object is created was presented by the different manufacturers:

JohnDeere.

The operator has to decide if sub-objects are to be used before starting to harvest at an object.

Ponsse.

SubObject is only created if included in oin-file. Cannot be created by operator

LogMax.

A default sub-object is always created when starting at new object. The SubObjectUserID of the default object cannot be edited later but e.g. SubObjectName can be changed.

Komatsu.

At least one sub-object must be created when starting at new object. The identities of the default object can be edited later on.

Dasa.

No sub-object is needed. A sub-object can be added at any time which means that stems without a sub-object may very well exist in an hpr-file.

Silvia7.

No support for creating a sub-object in oin-file.

SDC.

It will be possible to divide up production per sub-object in SDC's systems. However this has not been tested so far. SDC will be able to handle stems with and without reference to a SubObject.

BARKLATITUDE EXCLUDED FROM SPI-FILE.

No bark latitude has been included in the Swedish default spi-files. This is due to the fact that these SpeciesGroupDefinitions are to be possible to use all over Sweden. It is recommended that the operator is notified about this missing information and that the default value is extracted from the gps or that some "normal" Scandinavian latitude (e.g. 60 degrees) is used. It is also recommended that a latitude below 25 degrees is never ever to be used since there is a significant risk for negative diameters ub in that case.

STEM WITH VERY SHORT LOG

Skogforsk has discussed with one manufacturer how to handle two "fell cuts" where perhaps only a very thin disc was cut (7 cm)? Is this to be considered as a felled stem or a processed stem? Are there any circumstances where some kind of log has been cut from a stem but the stem is still considered to be a felled stem rather than a processed stem?

It was decided to let Skogforsk send out a questionnaire to all manufacturers regarding this issue. The following table is a summary of the answers received so far (2014-06-23):

	Definition SingleTreeProcessing	Definition SingleTreeFelling
Dasa	Two requirements must be fulfilled: 1. System must have measured a classified log (must be possible to cut a classified log, the stem must have been fed through the head up to min length from fell cut). 2. At least one log longer than 10 cm must have been cut.	SingleTreeFellId stems are never registered today.
Komatsu	Must have a log at least 11 cm long (default). The setting might be in the interval 0-30 cm (iii). It is possible to override the product information contained in the pricelist by some machine settings. Zero's (default) means that product information is interpreted strictly as in pricelist. A log must be cut above minimum length where diameter is larger than minimum diameter (eg 50 mm). The minimum diameter and length can be manually set to override bucking instruction.	No particular requirement on stem. (Operator has to choose tree species and fell cut must be done).
LogMax	Must have a log that is ≥ 10 cm long. The measured diameter must be larger than the minimum diameter for any product at its shortest length (stem must have been fed through the head up to min length from fell cut).	Must have done a fell cut. No other filtering done.
Parker	A single tree processed stem is started at the cut of the first classified (allowed) product. There is no length or diameter limit for this, eg. Min length 30 cm with min diameter 10 mm is possible, and after cutting such a piece a SingleTreeProcessed stem is started.	No classified pieces are cut from the stem. Operator can cut as long pieces as he wants, but if e.g. the diameter is too small, the stem is not registered as processed since there are no products made from the stem.
Ponsse	Must have at least one classified log. Classification of logs depends on the system setting. In Sweden shorter logs than min length of the assortment length class are	MTH 'mode' must be "on".

	Definition SingleTreeProcessing	Definition SingleTreeFelling
	unclassified. In Finland the limit is usually 150cm and logs longer than that are registered to the closest class (and below 150cm to unclassified).	A stem will be registered as SingleTreeFelled If it is picked up in the harvester head and there is no classified logs registered. In the other words, if only one stem is felled and the conditions of single tree processed stem are not fulfilled the stem is registered as a single tree felled stem.
John-Deere	No answer.	No answer.

This issue will be discussed again at the next meeting.

USE OF SPP-FUNCTION IN SWEDEN

John Arlinger reminded the StanForD group about the fact that all harvesters are supposed to start using the spp-function in Sweden in the same way as is done in Finland.

§ 9 Implementation of StanForD2010

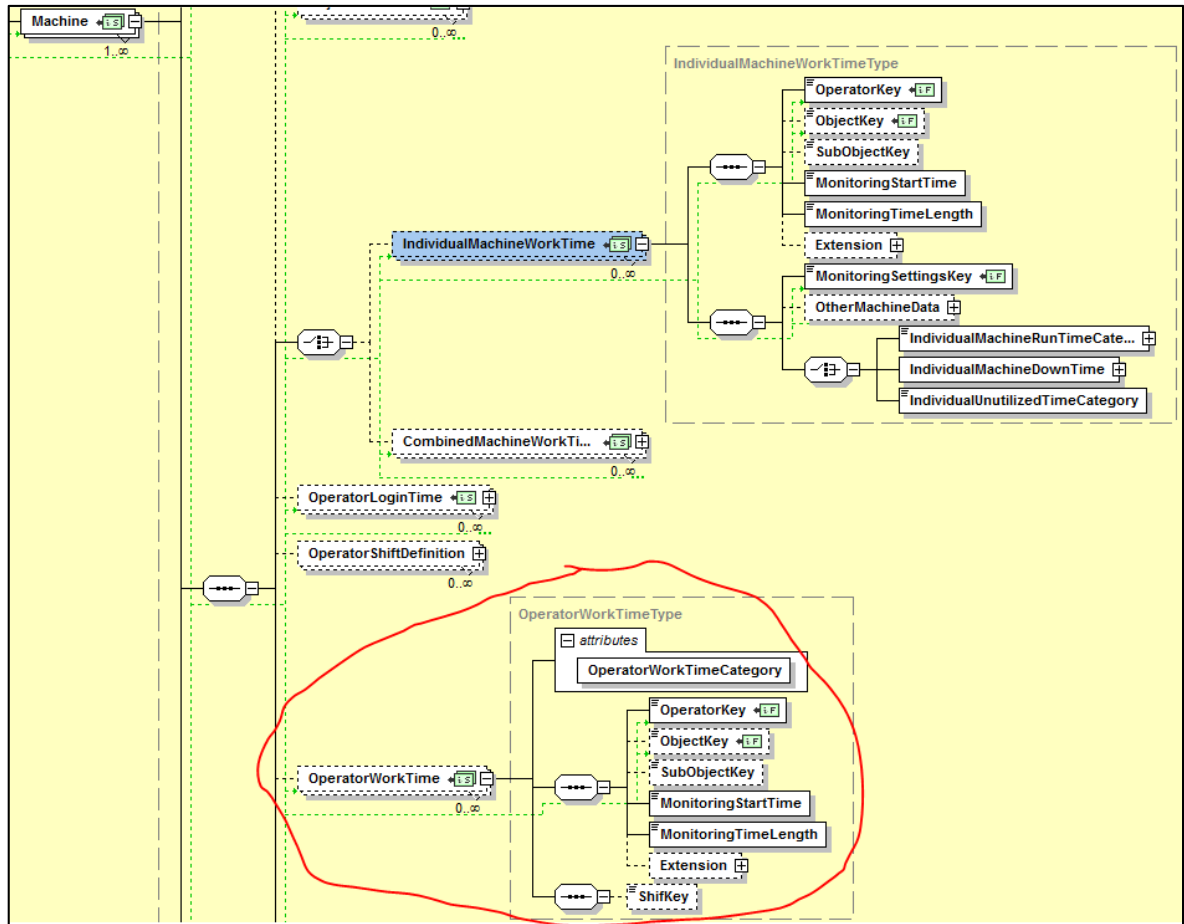
OPERATORWORKTIMES IN MOM-FILE (APPENDIX 5)

Based on discussion with David Zackrisson, LogMax (2014-04-03).

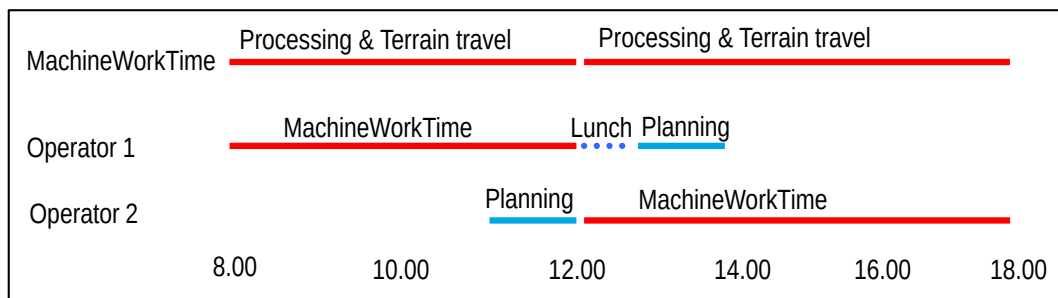
Operator work times are to a large extent registered manually by the operator in element `OperatorWorkTime` as illustrated below. There are five different types of times in attribute `OperatorWorkTimeCategory`:

- "MachineWorkTime"
- "Meal break"
- "Planning outside machine"
- "Travel to work outside machine"
- "Other work outside machine"

All of these categories must be registered manually except "MachineWorkTime" since this category indicates that the operator was working on the machine and these times are specified in more detail in `IndividualMachineWorkTime` or `CombinedMachineWorkTime`.

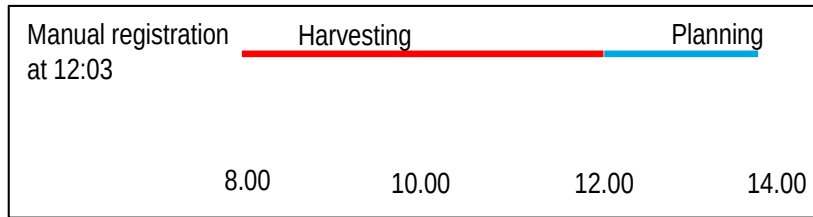


Observe that OperatorWorkTimes can be overlapping between different operators but MachineWorkTimes are not allowed to be overlapping as illustrated below:



Example of difficulties with operator work times

At 12:00 the operator manually registers “Planning outside machine” between 12:03 and 14:00 after he has been harvesting since 8:00 as illustrated below.



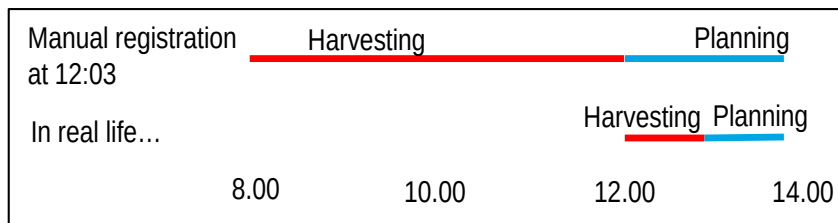
The times registered in the database are:

OperatorWorkTimeCategories at 12:03

MachineWorkTime = 8.00 – 12.00

Planning = 12.00 – 14.00

The operator does then continue to do processing until 13:00 as illustrated below.



It might be difficult to update the database in a correct way according to the following example where the times for “Planning outside machine” has been adjusted:

Alternative 1

OperatorWorkTimeCategories at 14:00

MachineWorkTime = 8.00 – 12.00

Planning outside machine = 13.00 – 14.00

MachineWorkTime = 12.03 – 13.00

The times could be registered according to the following example if we allow overlapping within operators in OperatorWorkTimes:

Alternative 2

OperatorWorkTimeCategories at 14:00

MachineWorkTime = 8.00 – 12.00

Planning outside machine = 12.00 – 14.00

MachineWorkTime = 12.03 – 13.00

Another alternative could be to never change existing times in OperatorWorkTimes and instead state that MachineWorkTimes always have a higher priority than OperatorWorkTimes as illustrated below

Alternative 3

OperatorWorkTimeCategories at 14:00

MachineWorkTime = 8.00 – 12.00

Planning outside machine = 12.00 – 14.00

MachineWorkTimeCategories

Processing = 08:00 – 12:00

Processing = 12:03 – 13:00

UnutilizedTime = 13:00 – 14:00

After a long discussion the meeting decided that alternative 1 is to be used. This means that MachineWorkTimes must always override manually registered times inside OperatorWorkTimes.

It is worth noting that we did decide to update some rules regarding reporting of mom-files at the meeting 2013-11-06--07. The decided requirements to be added to “StanForD2010_rules_tableV1p5.pdf” (R4.9) document were:

- No times MUST NOT be lost if we report automatically per time interval e.g. every hour, day or month
- If a specific time cannot be divided then it is possible to adjust ReportStartTime and ReportEndTime
- All times between ReportStartTime and ReportEndTime must be included (only exception is un-utilized times) if ReportFilterCategory is equal to “No filter”.

WOODFORCE IN FINLAND

Tapio Räsänen presented the ongoing work with the WoodForce project.

The Wood Force system is during development in Finland. It is a web-based work planning and management software system including mobile application. The companies which have initiated the system are Metsä group, Metsähallitus and Stora Enso. The system is built by the software company Fifth element.

Wood force system covers:

- Harvesting
- Forest energy
- Silviculture
- Other forestry work

Introduction for silviculture will be Q3-Q4 2014 and wood supply Q3-Q4 2015.

The diagram illustrates the data flow and integration between various systems in a contractor's office. It is divided into several sections:

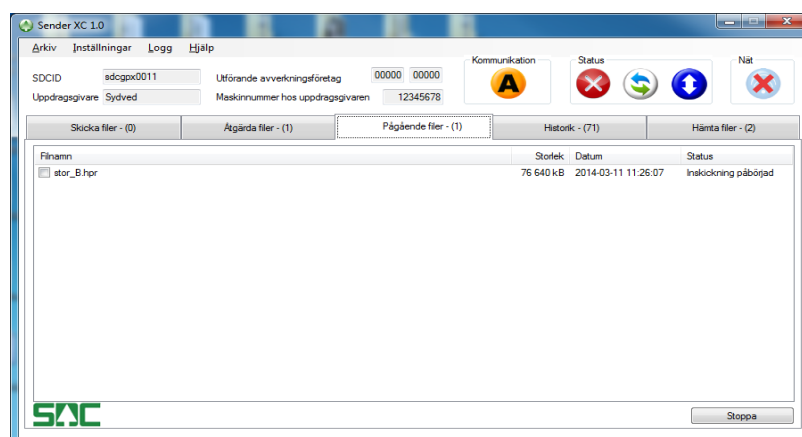
- Contractor's other office systems:** This section shows a computer monitor icon connected to a yellow box labeled "mom" and a blue box labeled "udi". The "mom" box is also connected to a green box labeled "udi". Below this, a yellow box labeled "mom" is connected to a blue box labeled "udi". A green box labeled "udi" is connected to a yellow box labeled "mom". A yellow box labeled "mom" is connected to a blue box labeled "udi". A yellow box labeled "mom" is connected to a blue box labeled "udi". A yellow box labeled "mom" is connected to a blue box labeled "udi".
- WoodForce machine application:** This section shows a green box labeled "fpr" and a green box labeled "fqc" connected to a grey box labeled "pri". A blue box labeled "fdi" and a blue box labeled "foi" are connected to a grey box labeled "pri". A green box labeled "hpr" and a green box labeled "hqc" are connected to a grey box labeled "prd". A grey box labeled "ktr" and a grey box labeled "stm" are connected to a grey box labeled "prd". A blue box labeled "pin" and a blue box labeled "oin" are connected to a grey box labeled "prd". A grey box labeled "spi" and a grey box labeled "ap1" are connected to a grey box labeled "prd". A grey box labeled "oai" is connected to a grey box labeled "prd".
- WoodForce:** This section shows a green box labeled "fpr" and a green box labeled "fqc" connected to a blue box labeled "fdi" and a blue box labeled "foi". A brown box labeled "Forest Data Standard files" is connected to a green box labeled "hpr" and a green box labeled "hqc". A grey box labeled "ktr" is connected to a green box labeled "hpr" and a green box labeled "hqc". A blue box labeled "pin" and a blue box labeled "oin" are connected to a grey box labeled "spi".
- Forest company information system:** This section shows a computer monitor icon connected to a green box labeled "fpr" and a green box labeled "fqc". A blue box labeled "fdi" and a blue box labeled "foi" are connected to a green box labeled "fpr" and a green box labeled "fqc". A brown box labeled "Forest Data Standard files" is connected to a green box labeled "hpr" and a green box labeled "hqc". A grey box labeled "ktr" is connected to a green box labeled "hpr" and a green box labeled "hqc". A blue box labeled "pin" and a blue box labeled "oin" are connected to a grey box labeled "spi".

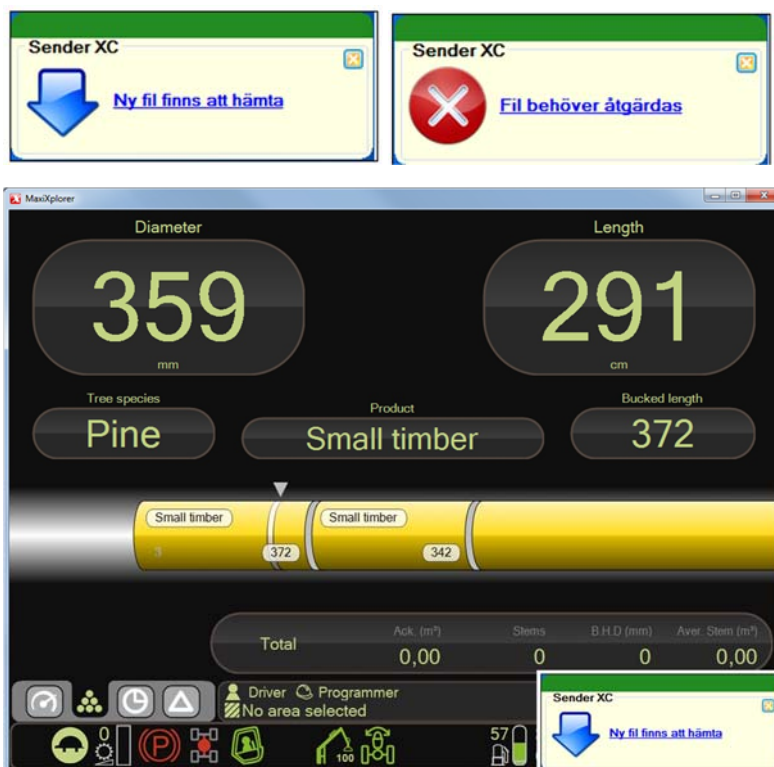
Data interfaces:

- StanForD 2010 v. 3.0
- Forest Data Standard

Lars Henriksson presented the work on developing a new Sender XC application.

Examples illustrating new GUI:





The new sender application will be field tested within 2-3 weeks, first together with Komatsu and then with other manufacturers. The program will be released on 18th of May. Sender XC will be available for testing by all manufacturers after the 25th of April.

SDC IMPLEMENTATION OF HPR AND OTHER MESSAGES IN SWEDEN

Lars Henriksson described the work on implementing the hpr-file. The hpr is now in use and around 10 machines are now sending hpr-files to SDC. Other harvesters are sending pri and these files are now converted into hpr before they are read into the SDC systems. The plans for implementing fpr and hqc were also presented. The plan is that fpr will be finish during late 2014 and hqc during spring 2015.

There are some limitations when SDC receives hpr-files:

- Maximum size – 30 000 stems per hpr/PRI (Partial reporting is recommended)
- Not more than one object per hpr

More precise rules and limitations will be published by SDC within the coming months.

SILVIA7 AND SDC TESTS (HOLMEN/SVEASKOG)

John briefly described the experiences from testing to use the new StanForD2010 instructions on a couple of different harvesters.

Except for some bugs and errors the main conclusion from the work so far is that it is important with office systems that support working with StanForD2010 in an efficient way.

IMPLEMENTING 3.0

Issue based on questions from Yli-Fossi Antti (2014-03-10) and Daniel Olsson, SDC (2014-03-24).

When will different actors start using version 3.0?

How urgent is the implementation for different actors?

Ponsse

Support for version 2.1 will be released during Q4 2014 and support for version 3.0 will be released during the autumn 2015.

Silvia7

Support for 2.1 since last year. Version 3.0 will be supported from May 2014.

JohnDeere

Supports 2.1 since autumn 2013. Version 3.0 will probably be supported from late summer 2014 (software version 1.19, hpr, mom, hpr).

LogMate

Supports 2.0 since spring 2013. Version 3.0 will probably be supported from late autumn 2014.

Komatsu

Supports 2.1 since spring 2013. Version 3.0 will probably be supported from late autumn 2014.

Dasa

The new Dasa Forester system (version 2.0) will be delivered from autumn 2014. No plans yet for version 3.0.

Observe that the timing of new Dasa releases is decided by the individual machine manufacturer (e.g. Rottne and EcoLog) and not by Dasa itself. The same applies to an existing software module for handling some StanForD2010 formats in older Dasa4 and Dasa 5 systems.

Haglöf caliper

Supports all hqc-versions today including 3.0.

SDC

Supports 2.1 since December 2013 for hpr. Version 3.0 will probably be supported from end of 2014.

Wood force

The Wood supply modules will be used from Q3-Q4 2015. Wood force will only support the use of version 3.0 and upwards. If there are older files the receiving system will convert data into 3.0 in a similar way as SDC do today.

§ 10 Skogforsk project “Improving diameter measuring”

Maria Nordström and Björn Hannrup presented to ongoing project for improving diameter measuring in harvesters.

§ 11 Other issues

No other issues.

§ 12 Next meeting

Regular StanForD2010 meeting StanForD meeting 2014-11-19--20, Uppsala

§ 13 End of meeting

Johan thanked everyone for their participation.

New Lithuanian bark functions

Proposal from Anders Nylund, Komatsu (2014-03-20).

The new bark functions suggested by Anders have been developed for Lithuanian conditions by the Forest Management and Wood Science Institute / the Lithuanian Association of Impartial Timber Scalers. The secretary has been in contact with Prof Edmundas Petrauskas who was responsible for the development of the bark functions.

Function

The Lithuanian functions were developed in 2007/08 (Petrauskas E., Rupšys P., Memgaudas R., Bosas G. Bark thickness variability models for prevailing tree species of Lithuania). In the study bark thickness was measured every second meter on 2384 stems. Logistic type models for approximating bark thickness relationship with diameter of measurement place and distance of measurement place from stump were developed for use in harvesters.

The suggested equations used for calculating bark thickness of several different species are described below.

Z_{sx2} = double bark thickness, mm

D_{sz} = diameter on bark, cm

H = measurement place (distance from the stump cross section), m

$$Z_{sx2} = a + bD_{sz}$$

$$a = \frac{a_3}{1 + \left(\frac{a_3}{a_1} - 1\right)e^{(-a_2H)}}$$

$$b = \frac{b_3}{1 + \left(\frac{b_3}{b_1} - 1\right)e^{(-b_2H)}}$$

PARAMETERS

The table below includes all parameters used in the equations above per species.

Parameters	Estimates of parameters							
	Species							
	Birch	Black alder	Aspen	Oak	Ash	Grey alder	Spruce	Pine
a1	-4,7797	6,4929	4,6621	-1,2626	7,2429	2,8632	3,8631192	9,1603048
a2	-0,2198	0,0580	51,7913	84,5837	1,0006	6,4259	14,456982	26,651015
a3	229,2413	3,2999	1,9993	6,5564	2,7317	1,2008	3,2548644	1,6841223
b1	1,0664	0,4827	0,6405	0,9751	0,2561	0,4297	0,4159701	0,8574951
b2	0,0831	0,0286	-0,0237	37,1511	59,0011	-0,1329	4,3664951	0,0017880
b3	0,5551	0,8089	5,8754	0,4833	0,4083	0,4103	0,3725121	0,0061711

EXAMPLES

The following tables illustrates calculated bark thickness for all species based on the parameters included in table above.

Pušis Pine	Dvigubas žievės storis, mm Double bark thickness, mm							
	Skersmuo su žieve, cm Diameter over bark, cm							
	8	16	20	28	44	52	60	
Matavimo vieta, m Measurement place, m	0	16,0	22,9	26,3	33,2	46,9	53,8	60,6
1,3	6,9	12,1	14,7	19,9	30,3	35,5	40,7	
3	5,6	9,6	11,6	15,5	23,4	27,3	31,3	
7	4,2	6,7	8,0	10,5	15,6	18,1		
11	3,5	5,4	6,3	8,2	11,9			
15	3,2	4,6	5,4	6,8				
19	2,9	4,1	4,7					
23	2,7	3,8						
27	2,6							

Eglė Spruce	Dvigubas žievės storis, mm Double bark thickness, mm							
	Skersmuo su žieve, cm Diameter over bark, cm							
	8	16	20	28	44	52	60	
Matavimo vieta, m Measurement place, m	0	7,2	10,5	12,2	15,5	22,2	25,5	28,8
1,3	6,2	9,2	10,7	13,7	19,6	22,6	25,6	
3	6,2	9,2	10,7	13,7	19,6	22,6	25,6	
7	6,2	9,2	10,7	13,7	19,6	22,6	25,6	
11	6,2	9,2	10,7	13,7	19,6	22,6		
15	6,2	9,2	10,7	13,7	19,6			
19	6,2	9,2	10,7	13,7				
23	6,2	9,2	10,7					
27	6,2	9,2						

Beržas Birch	Dvigubas žievės storis, mm Double bark thickness, mm							
	Skersmuo su žieve, cm Diameter over bark, cm							
	8	16	20	28	44	52	60	
Matavimo vieta, m Measurement place, m	0	3,8	12,3	16,5	25,1	42,1	50,7	59,2
1,3	4,2	12,0	15,9	23,7	39,3	47,1	54,9	
3	4,6	11,7	15,3	22,4	36,5	43,6	50,7	
7	5,1	11,1	14,2	20,2	32,4	38,4	44,5	
11	5,1	10,6	13,3	18,8	29,8	35,3		
15	5,0	10,1	12,7	17,9	28,2			
19	4,9	9,8	12,2	17,2				
23	4,7	9,5	11,9					
27	4,7	9,3						

Drebulė Aspen	Dvigubas žievės storis, mm Double bark thickness, mm							
	Skersmuo su žieve, cm Diameter over bark, cm							
	8	16	20	28	44	52	60	
Matavimo vieta, m Measurement place, m	0	9,8	14,9	17,5	22,6	32,8	38,0	43,1
1,3	7,0	12,0	14,5	19,4	29,4	34,4	39,4	
3	6,8	11,6	14,0	18,8	28,4	33,3	38,1	
7	6,4	10,8	13,0	17,4	26,3	30,7	35,1	
11	6,0	10,1	12,1	16,2	24,3	28,3		
15	5,7	9,4	11,3	15,0	22,4			
19	5,4	8,8	10,5	13,9				
23	5,1	8,2	9,8					
27	4,8	7,7						

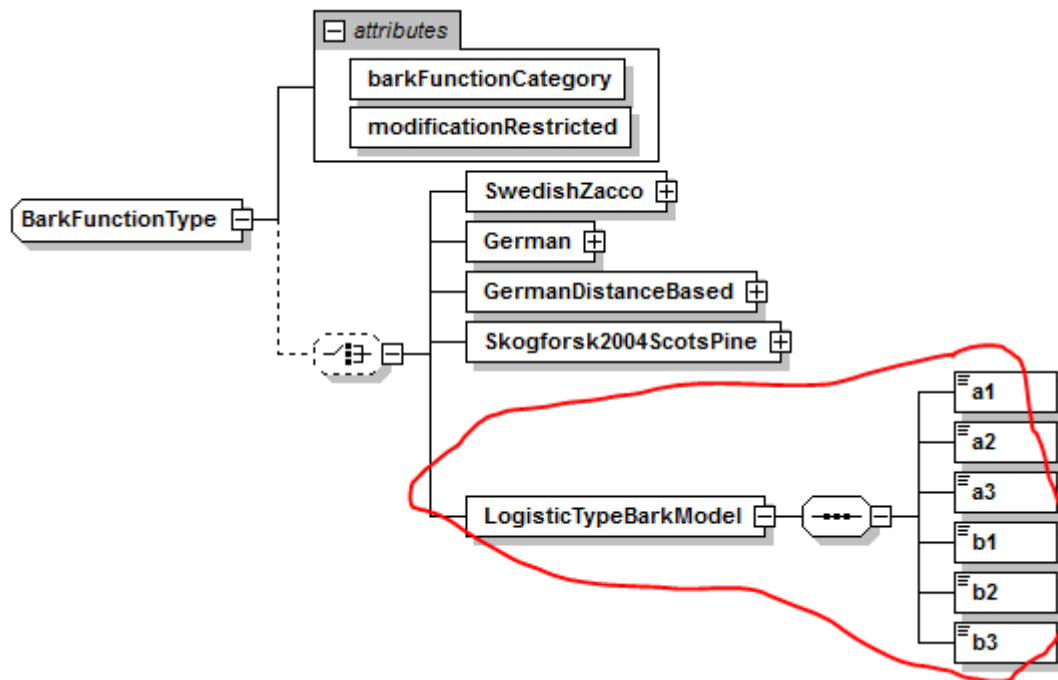
Juodalksnis Black alder	Dvigubas žievės storis, mm Double bark thickness, mm							
	Skersmuo su žieve, cm Diameter over bark, cm							
	8	16	20	28	44	52	60	
Matavimo vieta, m Measurement place, m	0	10,4	14,2	16,1	20,0	27,7	31,6	35,5
1,3	10,0	13,9	15,9	19,8	27,6	31,5	35,5	
3	9,6	13,6	15,6	19,6	27,6	31,6	35,6	
7	9,1	13,2	15,3	19,5	27,8	32,0	36,2	
11	8,8	13,1	15,3	19,6	28,3	32,6		
15	8,6	13,1	15,4	19,9	28,9			
19	8,6	13,2	15,6	20,2				
23	8,6	13,4	15,8					
27	8,6	13,5						

Ąžuolas Oak	Dvigubas žievės storis, mm Double bark thickness, mm							
	Skersmuo su žieve, cm Diameter over bark, cm							
	8	16	20	28	44	52	60	
Matavimo vieta, m Measurement place, m	0	6,5	14,3	18,2	26,0	41,6	49,4	57,2
1,3	10,4	14,3	16,2	20,1	27,8	31,7	35,6	
3	10,4	14,3	16,2	20,1	27,8	31,7	35,6	
7	10,4	14,3	16,2	20,1	27,8	31,7		
11	10,4	14,3	16,2	20,1	27,8			
15	10,4	14,3	16,2	20,1				
19	10,4	14,3	16,2					
23	10,4	14,3						
27	10,4							

Baltalksnis Grey alder	Dvigubas žievės storis, mm Double bark thickness, mm							
	Skersmuo su žieve, cm Diameter over bark, cm							
	8	16	20	28	44	52		
Matavimo vieta, m Measurement place, m	0	6,3	9,7	11,5	14,9	21,8	25,2	
1,3	4,7	8,1	9,9	13,3	20,3			
3	4,7	8,2	10,0	13,5				
7	4,9	8,6	10,5					
11	5,3	9,4						
15	6,1							

Uosis Ash	Dvigubas žievės storis, mm Double bark thickness, mm							
	Skersmuo su žieve, cm Diameter over bark, cm							
	8	16	20	28	44	52	60	
Matavimo vieta, m Measurement place, m	0	9,3	11,3	12,4	14,4	18,5	20,6	22,6
1,3	6,6	9,8	11,5	14,7	21,3	24,5	27,8	
3	6,1	9,4	11,0	14,3	20,8	24,1		
7	6,0	9,3	10,9	14,2	20,7			
11	6,0	9,3	10,9	14,2				
15	6,0	9,3	10,9					
19	6,0	9,3						
23	6,0							

Adding a new structure to the spi-file as illustrated below in order to make it possible to register the required parameters would, from a standard perspective, be quite simple. Observe that the naming of the new elements probably should be discussed.

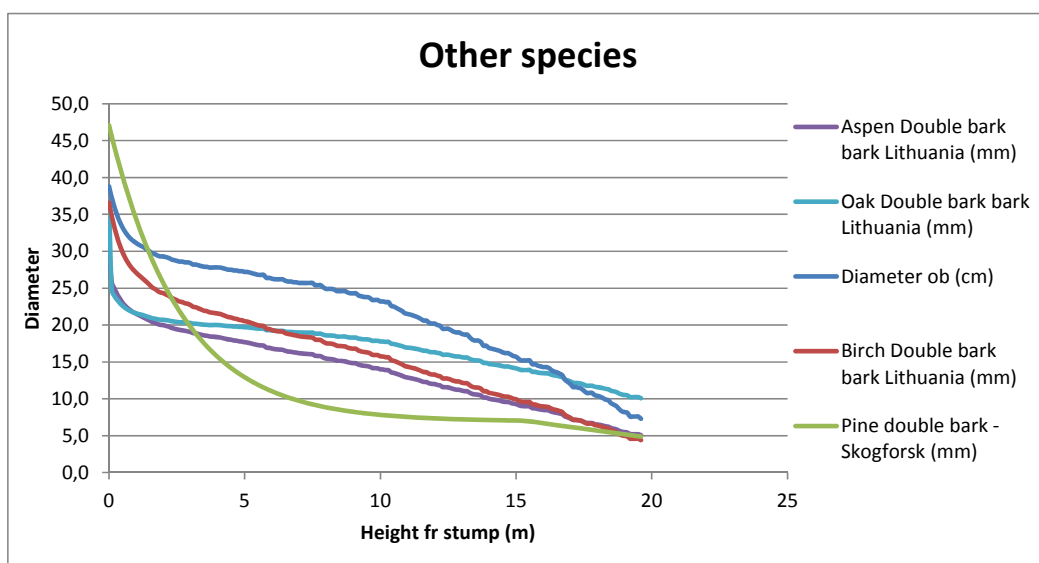
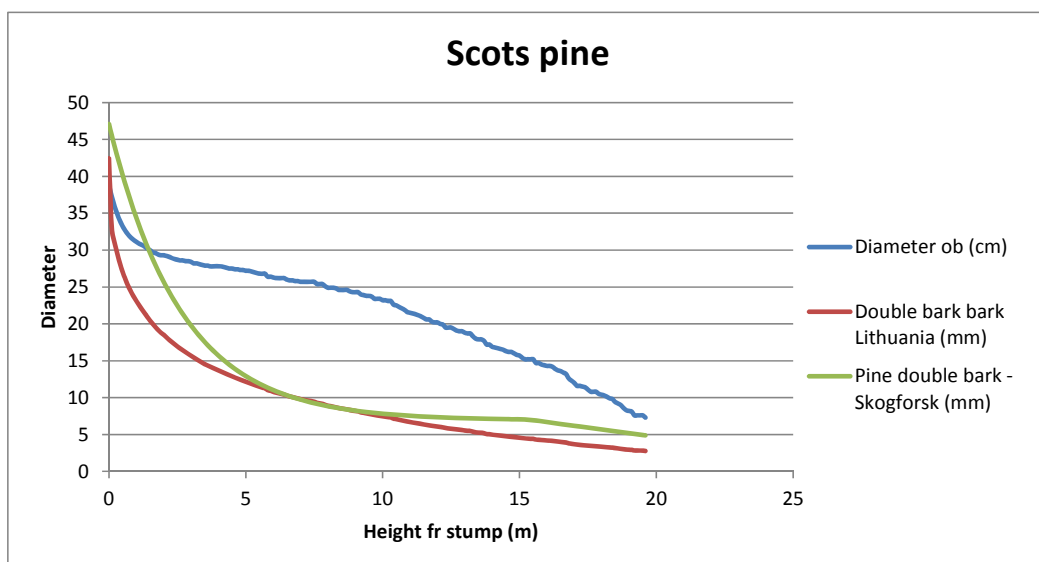
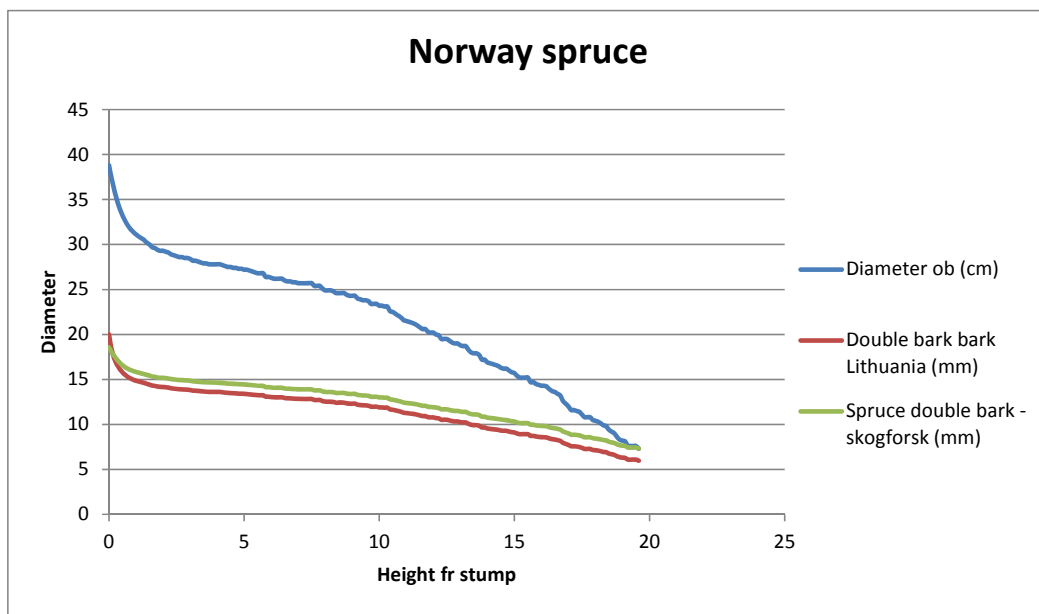


Skogforsk comments

A major issue is related to the future implementations of new bark functions. This is probably not the last request regarding new bark functions from a specific market. We already have bark functions originating from Sweden and Germany. The secretary has also heard some rumours that some other market is studying the possibility to develop new bark functions.

What makes these new functions very attractive is that the same equation (expression) can be used for a large number of different species.

When doing a simple comparison between the modern Swedish functions developed by Hannrup (2005) and these new functions it was found that the differences for spruce were very small while the function for Scots pine differed slightly more. The comparison was only done on one single tree. The following diagrams illustrates the effect of the different bark functions on spruce and pine (latitude 57 degrees). A test of the bark function for other broadleaves was also done but without having any Swedish bark functions to compare with.



Several different Swedish organizations have expressed a need for new relevant bark functions for other species than Scots pine and Norway spruce, e.g. for birch, aspen and lodgepole pine. VMF Syd and VMF Qbera (regional wood measuring associations) have therefore done some limited collection of bark thickness data together with Skogforsk. It is suggested that Skogforsk do a more thorough analyses of the new Latvian equations in order to determine if they are useable also in Sweden.

It is also suggested that we try to come up with element names that does not refer to a specific country or region in order to communicate that we believe that these functions may be relevant on other markets.