



John Arlinger

27 November 2015

Minutes StanForD2010

2015-11-18

Place:	Skogforsk, Uppsala, 10:00-16:00 2015-11-18
Participants:	Teemu Paldanius, Ponsse Lars Henriksson, SDC Maria Nordström, Skogforsk Jonas Thorsson, Dasa Tapio Räsänen, Metsäteho Niclas Eriksson, Komatsu Jean Plamondon, FP Innovation Martin Castonguay, FP Innovation Erik Kindlund, JohnDeere Antti Korkiakoski, JohnDeere Jonas Gustafsson, Sveaskog John Arlinger, Secretary Johan J. Möller, Chairman Pasi Palonen, Parker (by Skype) Goetz Roth, Interpine, NZ (by Skype) Urban Folkesson, Ponsse (by Skype)

Decision summary:

- Final decision before releasing version 3.2 is on the 4th of February (13:00 CET)
- Version 3.3 will be implemented next (February 2017) year, the final release of 4.0 will not be before February 2018.
- New fill-type (DottedFill) added to FormatFillStyle (ogi and ogr) added
- Boom angle when felling added to standard

- SpeciesgroupKey added as optional element to unclassified products
- New logistic bark function added
- BioenergyAdaptionType annotation adjusted
- Order of message attributes - decided
- Naming conventions concerning envelope was postponed to next meeting, Komatsu responsible
- ProductUserID in DeliveryDefintion ignored if ProductDefinition and SpeciesGroupDefinition are not included in fdi.

Action list:

- All randomly selected stems that are rejected by the operator must be saved in an hqc-file including a reason for rejection. This file is not to be sent to the caliper but directly to the forest company (in Sweden to SDC).
- It has been decided that OperatorUserID is to be set by the machine control system. It was strongly recommended that all control systems implement FirstName, LastName, BusinessName and BusinessID ASAP in order to be able to register machine owner specific information regarding operator identities. Elements FirstName, LastName, BusinessName and BusinessID must be possible to edit by the operator.
Additional comment at meeting: Swedish nomenclature for elements above to be added to general documentation.
- It is strongly recommended that this is made possible by a machine setting to include diameter vector in normal production reporting (hpr). However, it is left open to the manufacturers exactly how this functionality is implemented (subset of stems, all stems or some other method).
- It is recommended that it is always possible to divide up fpr.- and hpr-data in order to avoid having files with more than one single object.
- It is recommended that new systems that receives production messages (fpr and hpr) are developed in a way that it is possible to handle several different harvesting objects within one file.
- It is recommended that all manufacturers makes it possible to update a product (pin) during harvesting at a harvesting object and that the GUI for operators is simple when updating a product (e.g. keeping seeting for grades and color matrix).

§ 1 Opening of meeting

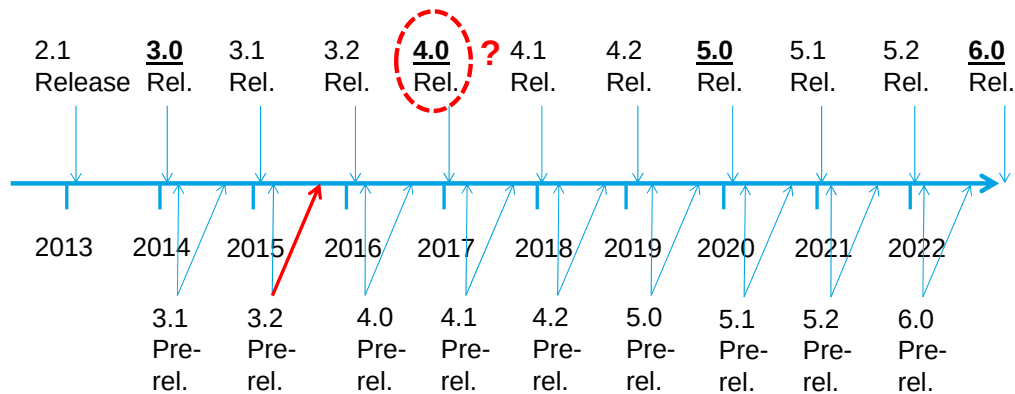
Johan J Möller opened the meeting.

§ 2 Agenda

The agenda was accepted by the meeting.

§ 3 Implementing version 3.3 or 4.0?

The secretary presented the road map for implementing new standard version as defined in 2012.



An important issue to discuss is whether we should aim for a new major version 4.0 in 2016 or stay with major version 3. There are presently only a limited number of issues that requires a new major version:

- ReportFilterCategory enumeration with extra "space" ("Object filter ")
- Elements without data types: UserDefinedData, DeliveryPresentationOrder (fdi, fpr)
- Renaming of bark functions & excluding some older bark functions
- Attribute "agency" needed for "UserIDs
- ShiftKey in Individual- and CombinedMachineWorkTime
- Decreasing hpr size by modifying element names in DiameterVector
- Fdi without SpeciesGroup- and ProductDefinition
- Some elements optional → mandatory

Below are a more detailed description of the latest 4.0 issues (since last meeting).

HPR SIZE AND DIAMETERVECTOR ELEMENTS

Proposal Fredrik Tjernberg, 2015-09-07

Fredrik and John Arlinger discussed the possibilities to decrease the size of hpr-files with DiameterVectors included. Fredrik described a possible solution below.

The size of DiameterVector could be minimized by modifying element and attribute names according to the following list:

- StemDiameters = sd
- DiameterMeasuredStartHeight = sh
- DiameterMeasuredEndHeight = eh
- DiameterValue = d
- diameterPosition = dp
- diameterMeasurementCategory = dc

Example files:

 5710085J-05_20120210_141903 Exkl DiaVektor.hpr	2015-09-03 11:19	HPR File	24 707 KB
 5710085J-05_20120210_141903 Exkl DiaVektor.zip	2015-09-08 15:48	WinZip File	915 KB
 5710085J-05_20120210_141903 Inkl DiaVektor.hpr	2015-09-03 11:34	HPR File	133 039 KB
 5710085J-05_20120210_141903 Inkl DiaVektor.zip	2015-09-08 15:47	WinZip File	5 059 KB
 5710085J-05_20120210_141903 Inkl minimeradDiaVektor.hpr	2015-09-03 11:38	HPR File	65 397 KB
 5710085J-05_20120210_141903 Inkl minimeradDiaVektor.zip	2015-09-08 15:47	WinZip File	4 061 KB

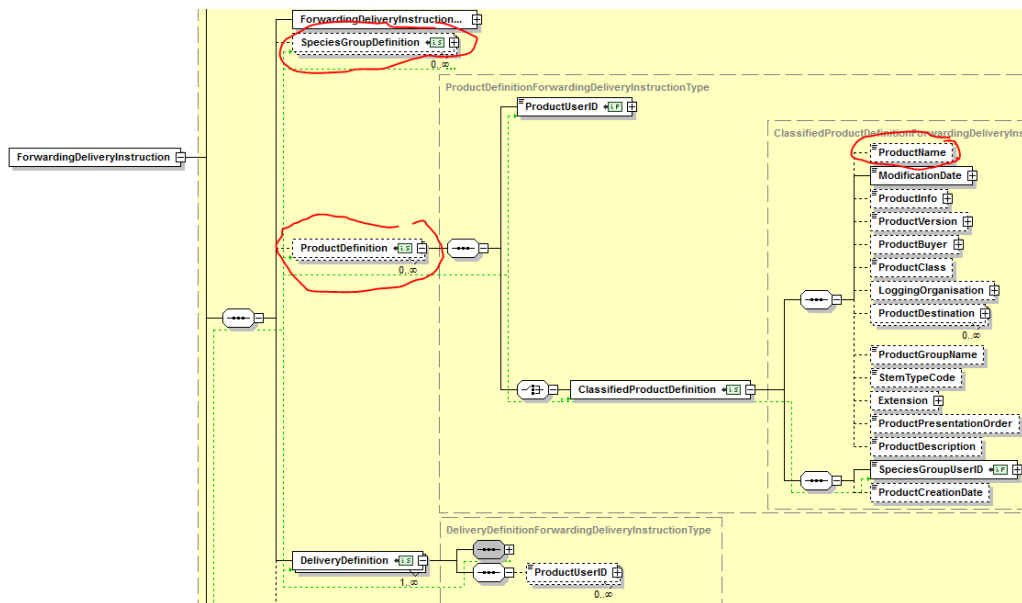
FDI WITHOUT PRODUCTDEFINITION

Fredrik Tjernberg, 2015-11-04

It has been noted that it is possible to create an fdi-file where the DeliveryDefinition includes a ProductUserID but without including a ProductDefinition and SpeciesGroupDefinition as illustrated below:

= weightUnit	kg		
= xmlns:xsi	http://www.w3.org/2001/XMLSchema-instance		
= xsi:schemaLoca...	urn:skogforsk:stanford2010 ForwardingDeliveryInstruction_V3p0.xsd		
▲ ForwardingDeliveryInstructionHeader			
⌘ SenderApplication			
⌘ CreationDate	2015-09-08T14:59:27+03:00		
⌘ ModificationDate	2015-09-14T14:28:45+03:00		
⌘ ApplicationVersionCreated			
⌘ ApplicationVersionModified			
⌘ CountryCode			
▲ DeliveryDefinition (9)			
	⌘ DeliveryUserID	⌘ ModificationDate	⌘ ProductUserID
1	SE_1604E_M2570_R003006_Y	2015-10-09T14:03:56+03:00	SE_1604E_M2570_R003006_Y
2	SE_1604E_T6700_R103007S_S	2015-10-09T14:03:56+03:00	SE_1604E_T6700_R103007S_S
3	SE_1604E_T3600_R002001_Y	2015-10-09T14:03:56+03:00	SE_1604E_T3600_R002001_Y

It will probably be proposed with version 4.0 that the schema is updated in order to make it mandatory to include ProductDefinition and SpeciesGroupDefinition in case ProductUserID is included with the DeliveryDefinition. It might also be relevant to make ProductName mandatory in order to make certain that there is some kind of relevant information connected to the products.



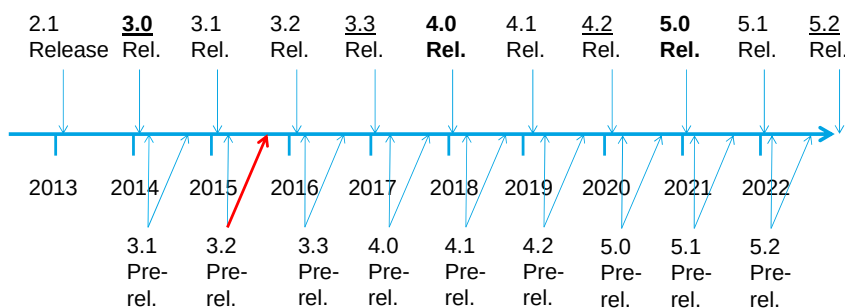
The following constraint (Juha-Antti Sorsa, 2015-11-17) will solve this issue:

```
<xsd:key name="ProductUserIDProductDefinition">
  <xsd:selector xpath="sfd:ProductDefinition"/>
    <xsd:field xpath="sfd:ProductUserID"/>
</xsd:key>
<xsd:keyref name="ProductUserIDRefProductDefinition" refer="ProductUserIDProductDefinition">
  <xsd:selector xpath="sfd:DeliveryDefinition"/>
    <xsd:field xpath="sfd:ProductUserID"/>
</xsd:keyref>
```

It was discussed at the meeting whether to implement this constraint immediately. However, this would break backward compatibility within major version 3. The secretary and Juha-Antti Sorsa discussed this issue after the meeting and strongly recommend that we postpone this update until version 4.0. At least as long as we do not change the rule that we must always have backward compatibility within a major version.

NEXT VERSION 3.3 OR 4.0?

No participant expressed a need for quickly implementing version 4.0. The meeting therefore decided to implement version 3.3 in January 2017, thus waiting for at least another two years before implementing 4.0. This means that the roadmap is to be modified according to the following illustration (present meeting indicated by red arrow):



§3 Information about decisions at previous meetings

NEW FILL-TYPE IN FORMATFILLSTYLE (OGI)

The table below illustrates the different fill types to be used by forest companies in the southern part of Sweden for “environmental no-go” areas. The fill types are based on an agreement between a number of forest companies and the Swedish forest agency.

Lager	Tecken-förklaring	Färgkod (hex)	Beskrivning
Biotopskydd		993399	Lila kantlinje med svart kontur, lila fyllnad halvtransparent
Fornlamning och Skogohistoria (linje)		ff6e00	Orange linje med svart kontur
Fornlamning och Skogohistoria (punkt)		ff6e00	Orange triangel med svart kontur, vänd med spetsen nedåt
Fornlamning och Skogohistoria (yta)		ff6e00	Orange kantlinje med svart kontur, fyllnad orange prickar med
Nationalpark		336b4f	svart kantlinje, mörkgrön fyllnad halvtransparent
Natura2000		00DD00	Ljusgrön kantlinje, ljusgrön kryssfyllnad
Naturreservat		7ccb52	Svart kantlinje, ljusgrön fyllnad halvtransparent
Naturvarden		DCDC00	Svart kantlinje, gul snedrandig fyllnad (slash "/") tät
Naturvardsavtal		FF66DC	Rosakantlinje med svart kontur, grå fyllnad halvtransparent
Nyckelbiotoper		DC0000	Svart kantlinje, röd snedrandig fyllnad (slash "/") tät
Sumpskogar		0000FF	Blå kantlinje, fyllnad av blå horisontella linjer, gles
Vattenskydd		8888FF	Blå kantlinje, text "Vattenskydd" med blå text på vit bakgrund

The fill type for polygons for historical/cultural remnants does not exist today in StanForD. It was therefore decided (2015-04-15--16) that we add a new enumeration “DottedFill” to element FormatFillStyle. This fill style should look like this:

§ 4. Proposals StanForD2010 projects

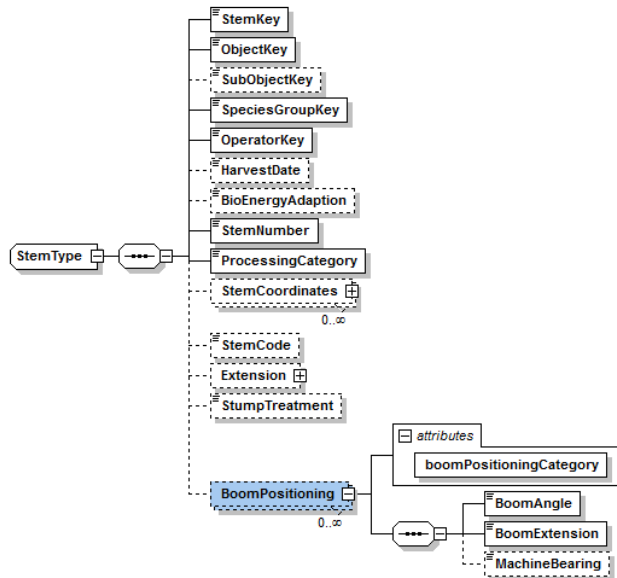
BOOM ANGLE WHEN FELLING

Johan Möller, Skogforsk, 2015-04-01

It would be an advantage to know the exact position of the harvester head when felling a tree in cases where the hpr-file is used for following up thinning. Since it

is not deemed to be possible to have a GPS on the head tests have been carried out by Skogforsk and some manufacturers where the boom angle is registered in the hpr-file.

It was decided to add a new structure to the CoordinatesType making it possible to register boom angle, compass bearing of machine and boom extension (length) as illustrated by figure and table below.

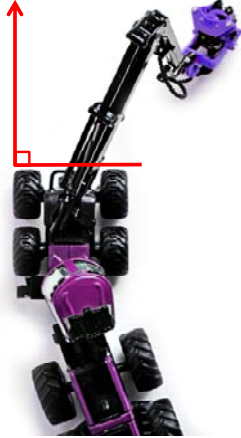


Name	Description	Unit	Type
BoomPositioning	Information used to calculate position of harvester head based on angle and extension of boom.		
boomPositioning-Category	Definition of when boom angle is registered: "Felling", "Last log cut".	List	
BoomAngle	Angle of boom (0-360 degrees) when felling tree or when last log is cut (according to boomPositioningCategory). BoomAngle is equal to the difference between MachineBearing and the angle of the boom. BoomAngle is registered in degrees where 0° is equal to MachineBearing, 0° is thus straight ahead, 90° is straight to the right and 270° is straight to the left.	Degrees	nonnegative-Integer
BoomExtension	Extension of boom when angle is registered. This is the distance from the harvester to the harvester head. This value can be a "default" value indicating the "normal" extension.	Cm	Positive-Integer
MachineBearing	The bearing (0-360 degrees) of the machine when boom angle is registered. MachineBearing is perpendicular to the front wheel axis (90°). MachineBearing is registered in degrees where 0° is north, 90° is east, 180° is south and 270° is west.	Degrees	nonnegative-Integer

It was pointed out by Teemu at the previous meeting that the boom angle might be difficult to standardize since the basic construction differs between different harvester models (e.g. Ponsse Ergo). The secretary pointed out that this is to be an optional element and that it would be possible to use element StemCoordinates with attribute receiverPosition having the value "Crane tip position when felling

the tree” in the future. The definitions of BoomAngle and MachineBearing has been updated with the minutes. The following examples were also created after the meeting in order to illustrate how these elements are defined.

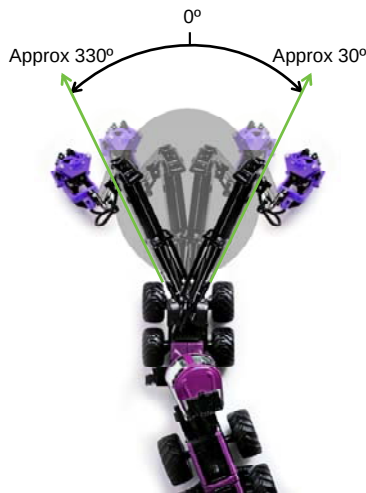
Examples illustrating boom angle data



MachineBearing (red arrow) is perpendicular to the front wheel axis (90°) as illustrated below. MachineBearing is registered in degrees ($0-360^\circ$) where 0° is north, 90° is east, 180° is south and 270° is west.



BoomAngle is equal to the difference between MachineBearing (red arrow) and the angle of the boom (green arrow). BoomAngle is registered in degrees ($0-360^\circ$) where 0° is equal to MachineBearing.



BoomAngle is registered in degrees (0-360°) where 0° is equal to MachineBearing. 0° is thus straight ahead, 90° is straight to the right and 270° is straight to the left.

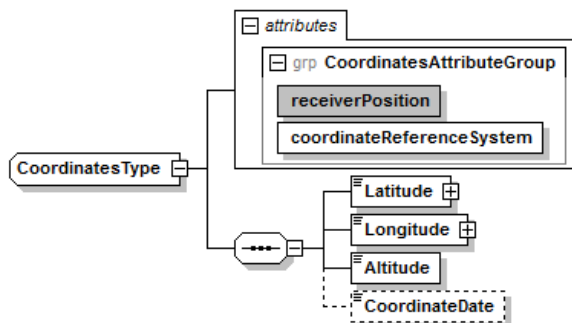


BoomExtension (blue arrow) is the distance between the where the boom is attached (base machine) to the harvester head. Can be the average (normal) extension if the exact extension is unknown at the time of felling.

ANNOTATION FOR RECEIVERPOSITION

Suggestion below is based on a discussion between John Arlinger and Thomas Purfurst (Bavarian State Forest), 2015-11-05.

All Coordinates in StanForD messages have the attribute receiverPosition. GPS coordinates are e.g. included in CreationCoordinates, LoadingCoordinates, LocationCoordinates, StemCoordinates.



Enumeration value “Crane tip position when felling the tree” is always included but only relevant for StemCoordinates.

It was therefore decided that the annotation for receiverPosition is updated according to the following text:

Position of coordinate registration in file: "Base machine position", "Crane tip position when felling the tree". Observe that only "Base machine position" is relevant for all types of coordinates. Other enumerations valid only in some specific situations.

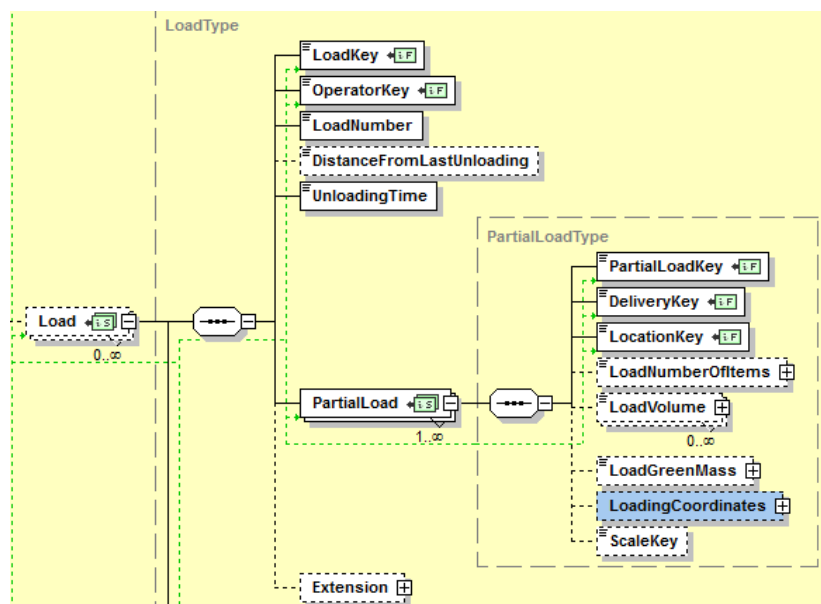
COORDINATES IN FORWARDEDPRODUCTION

The issues below are based on a discussion between John Arlinger and Thomas Purfurst (Bavarian State Forest), 2015-11-05. No proposals included since these issues were first discussed just before the meeting.

The following coordinates exist in fpr-files:

- CreationCoordinates, LoadingCoordinates, LocationCoordinates,

Would it be relevant to add UnloadingCoordinates to PartialLoad?



Using coordinates for forwarders in PartialLoad might mean:

- New enumerations “Grapple position when opening grapple to release logs” and “Grapple position when closing grapple to pick up logs”

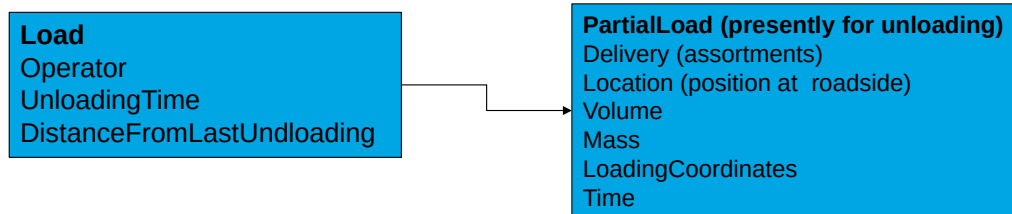
Boom angle for Unloading and PartialLoad?

- Attributes for boomAngleCategory: Felling, Last log cut, Release logs, Pick up logs.

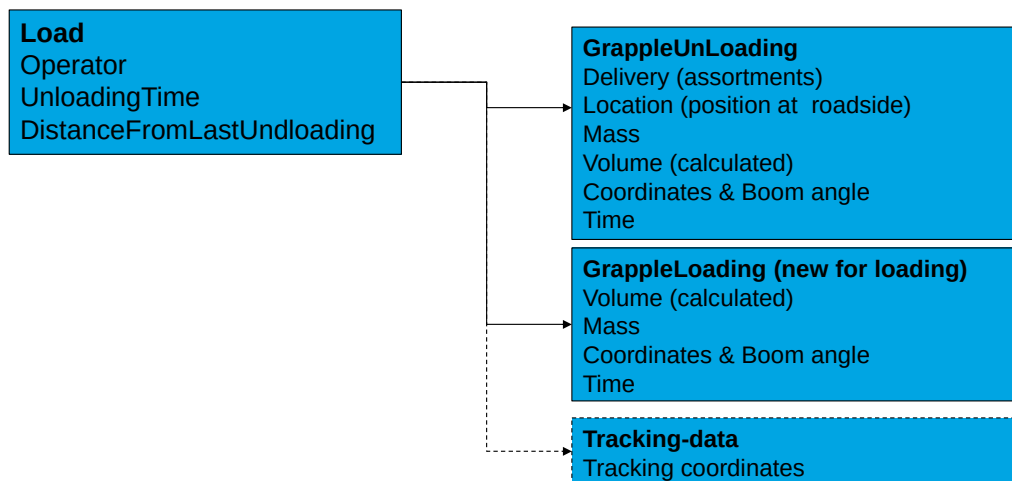
However, adding these new enumerations into the present structure will make the fpr-file even more complex than today.

Remodel fpr-production

Present structure (illustrated below) is quite complex due to the fact that it can handle several different methods (crane scales, load space scales and manual estimations) with varying resolution.



A solution, in order to make it possible to register data with a higher resolution, could be to separate data estimated per load from data based on scaling each grapple load. A new structure could be developed for registering grapple scale data (illustrated below). It would then be possible to register loading and unloading data with e.g. coordinates and times for both events.

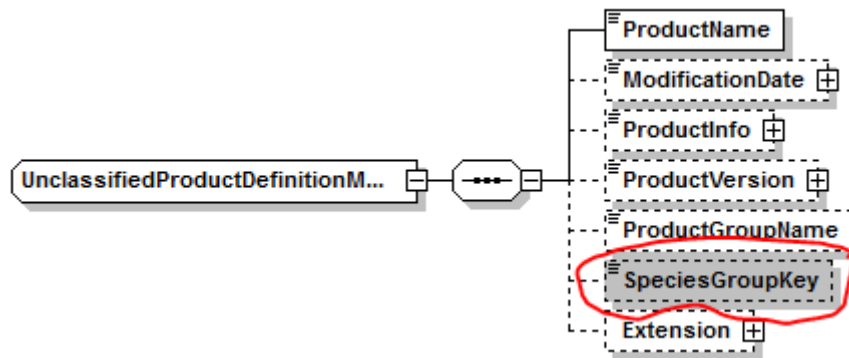


A more detailed basis for discussion will be presented by Skogforsk at the next meeting.

UNCLASSIFIED VOLUMES PER SPECIES GROUP

Per Knutsson, CGI, 2015-04-08.

There are two different types of implementations of the unclassified products. Most manufacturers seem to have implemented one unclassified product per species while at least one manufacturer only have one single unclassified product for all species. It would be more straight forward to include the species groups also per unclassified product in order to present unclassified volumes per species. It was therefore decided that we add a new optional element SpeciesGroupKey under UnclassifiedProductDefinition according to the figure below:



BARK FUNCTION

The possibility to add a new Lithuanian bark function has been discussed at the last meetings.

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

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

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

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

Björn Hannrup did a preliminary analyzes of the Lithuanian bark function in early February using bark data from some older Swedish studies. The main results of his comparisons between different types of bark functions are illustrated in table 1-3 and figure 1-3.

Table 1) Comparison of bark functions on Scots pine

Function	N	Mean dev (mm)	Std. dev. (mm)
Skogforsk_pine	1 276	2,7	5,0
Zacco	1 276	10,0	11,8
Petrauskas m. fl	1276	6,1	7,0

Table 2) Comparison of bark functions on Norway spruce

Function	N	Mean dev (mm)	Std. dev. (mm)
Skogforsk_spruce	991	3,7	2,7
Zacco	991	3,9	2,7
Petrauskas m. fl	991	4,1	2,8

Table 3) Comparison of bark functions on birch

Function	N	Mean dev (mm)	Std. dev. (mm)
Skogforsk_Tall	235	4,7	8,9
Zacco tall	234	12,8	11,5
Petrauskas m. fl	234	5,8	8,5

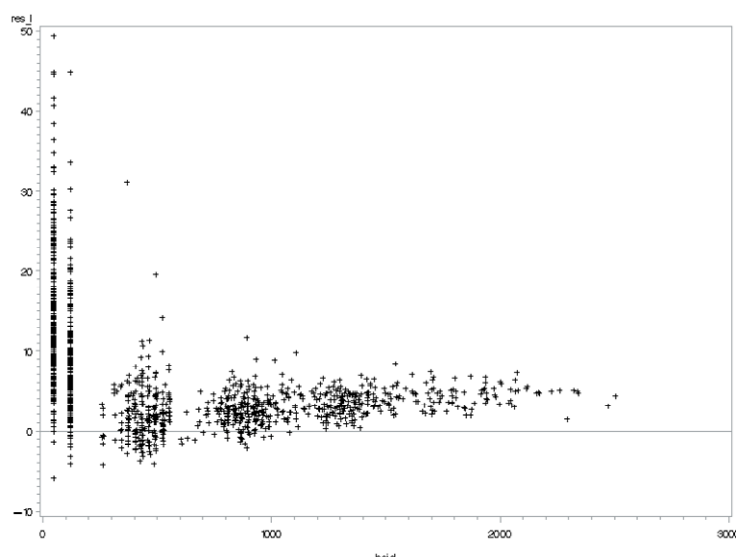


Figure 1) Residual plot for Lithuanian bark function used on Scots pine.

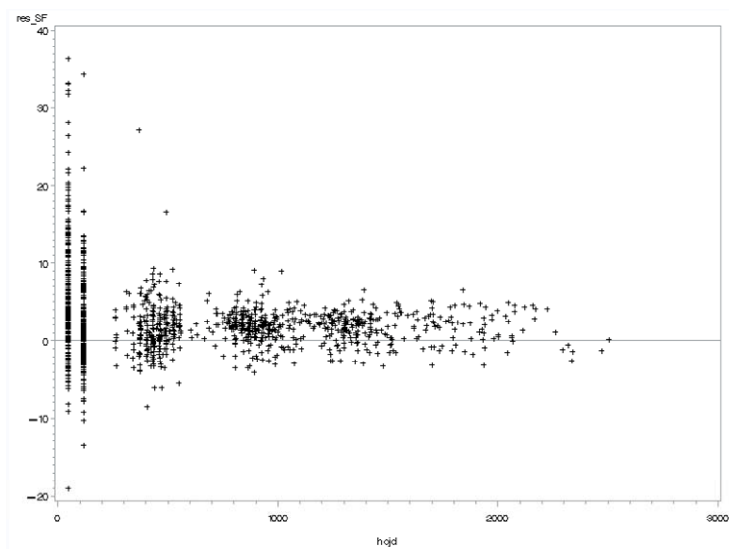


Figure 2) Residual plot for Skogforsk-Pine function used on Scots pine.

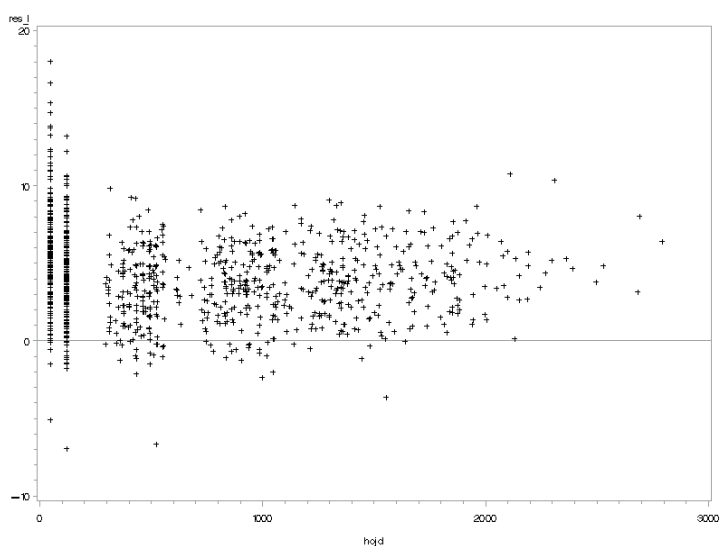


Figure 3) Residual plot for Lithuanian bark function used on Norway spruce

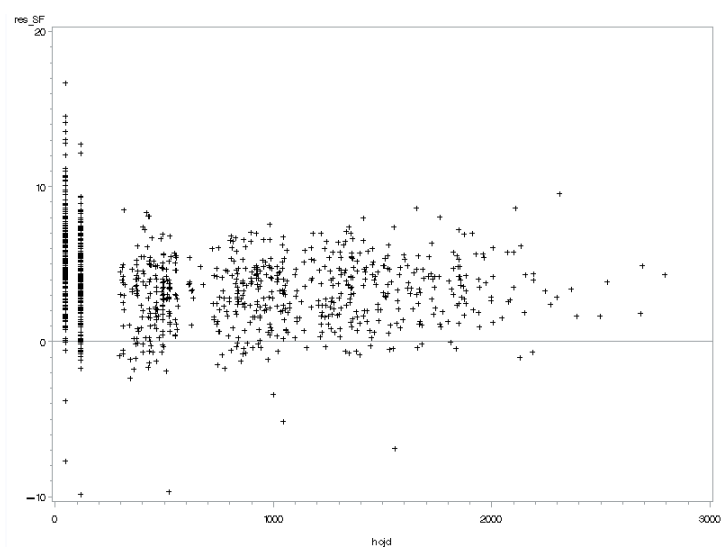


Figure 4) Residual plot for Skogforsk-Spruce function on Norway spruce

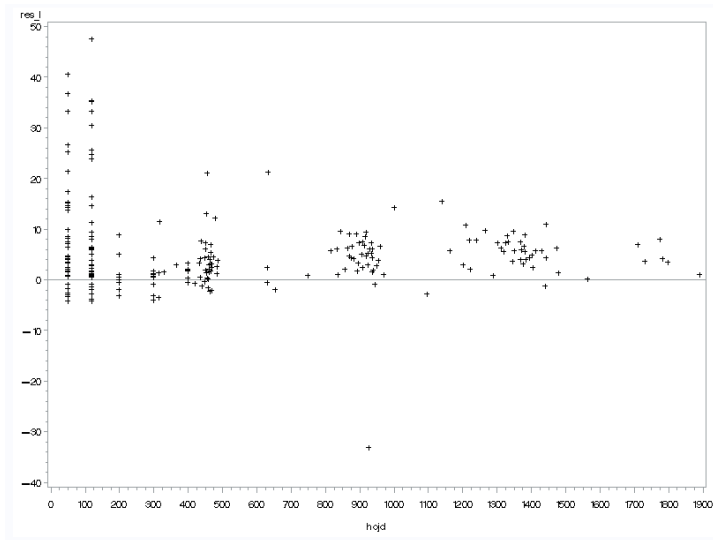


Figure 5) Residual plot for Lithuanian bark function on Birch

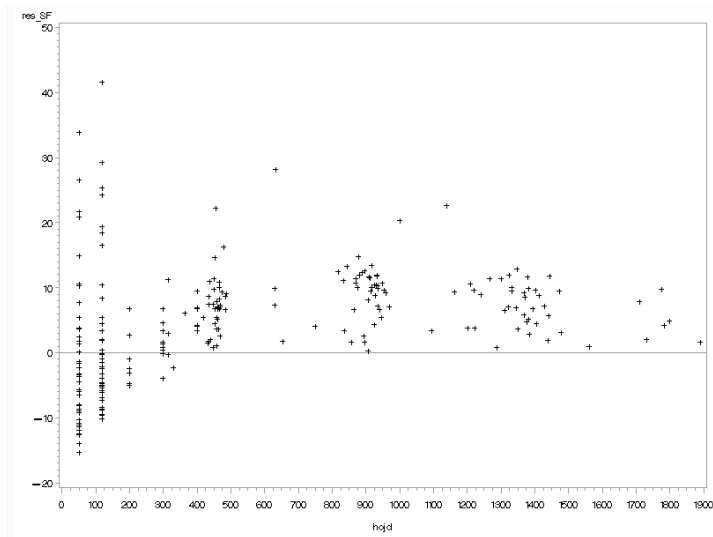


Figure 6) Residual plot for Skogforsk-Pine function on birch

The main result from Hannrup's study was that the Lithuanian function seems to work fine for spruce and birch. This means that we could probably exclude the present "Zacco" and "Skogforsk spruce" functions.

Some adjustments are probably needed for Scots pine if we are to exclude the present "Skogforsk pine" function (illustrated in figure 7):

- The slope of the curve needs to be adjusted, perhaps through calculating a new set of parameters based on Swedish data.
- Might be a need for compensation factor for latitude.

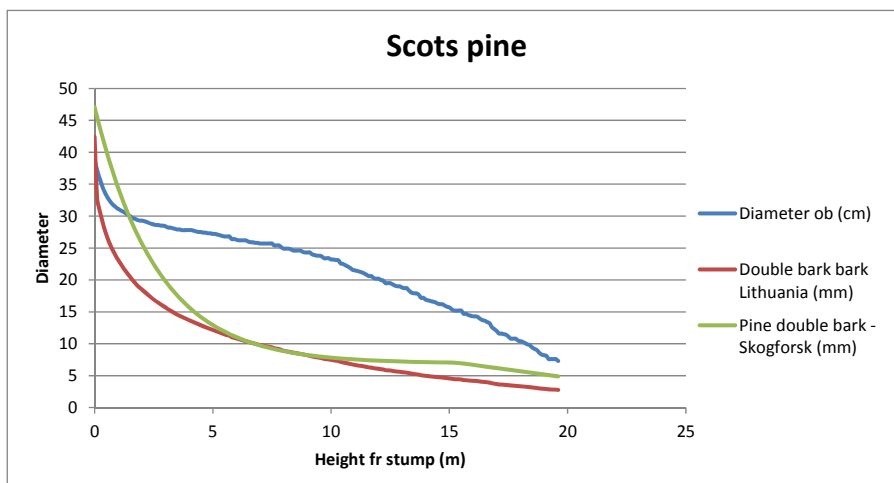


Figure 7) Bark thickness for a single Scots pine stem.

We have discussed the possibility to implement a new bark matrix instead of a new function. However, a matrix makes it more difficult to determine what type of bark function was used in hpr-file, evaluating the bark calculations is more complex since it has to be done for each possible diameter position. A function is probably easier to administrate, support and implement. It will be suggested that we decide that “any proposals for new functions must include proof of improvement” if we decide to introduce a new logistic bark function.

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. It has been noted that having country specific naming of the different bark functions is probably not a good idea.

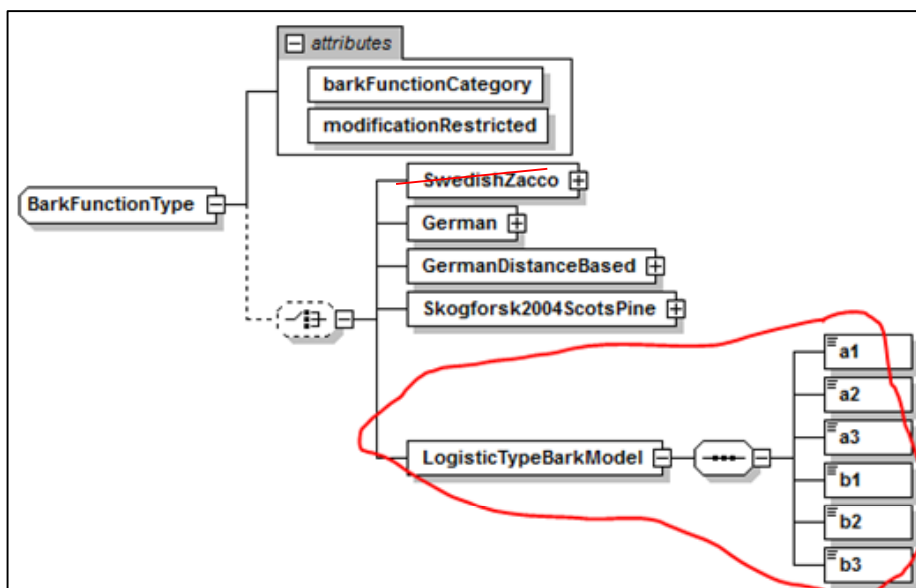


Figure 8) Possible new structure for registering logistic bark function, both SwedishZacco and Skogforsk_spruce functions to be excluded in version 4.0.

Even though a matrix would be more flexible it was decided to add a logistic function by making it possible to register the parameters of the function (according to figure above). The basic reasons for this is that it makes it simpler to control, implement, support and administrate the bark-functions in StanForD2010. It was also decided that we will exclude “Skogforsk Gran” with version 4.0 and that any proposals for additional functions must include proof of improvement.

BIOENERGYADAPTIONTYPE ANNOTATION

Jonas Thorsson, Dasa, 15-05-07

Value “None” is included in annotation for BioEnergyAdaptionType but it is not a valid enumeration values in version 3.*. It was decided that “None” is excluded from the annotation.

TOPLOGFREEBUCK ANNOTATION

Proposal regarding an update of TopLogFreeBuck definition (included with agenda) was withdrawn by Skogforsk before the meeting. A related issue is discussed under §6.

MESSAGE ATTRIBUTES

Nazmul Buhyan, Skogforsk, 2015-05-05

Nazmul discovered some strange behaviour when testing some new hpr-files. An application (adding some extensions to the hpr) suddenly added the prefix Sfd to all elements in the file. This had never happened before with any other hpr-files.

Nazmul realized that there are differences between the different manufacturers regarding how they had added the namespace attributes. The location of ”xmlns:sfd=urn:skogforsk:stanford2010” ” seems to be the problem. Everything works well if Nazmul changed the order so that “xmlns:sfd=” came before “xmlns=” or if he deleted the “xmlns:sfd”-attribute.

This is what it looks like in some files from different manufacturers.

Ponsse-file giving a problem:

```
<HarvestedProduction xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xsi:schemaLocation="urn:skogforsk:stanford2010 HarvestedProduction_V2p1.xsd"
messageType="hpr" areaUnit="ha" diameterUnit="mm" lengthUnit="cm" volumeUnit="m3"
weightUnit="kg" version="2.1" xmlns="urn:skogforsk:stanford2010"
xmlns:sfd="urn:skogforsk:stanford2010">
```

Other Ponsse-file which is ok:

```
<HarvestedProduction xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xsi:schemaLocation="urn:skogforsk:stanford2010 HarvestedProduction_V2p1.xsd"
messageType="hpr" areaUnit="ha" diameterUnit="mm" lengthUnit="cm" volumeUnit="m3"
weightUnit="kg" version="2.1" xmlns="urn:skogforsk:stanford2010">
```

Maxi-file:

```
<HarvestedProduction xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" messageType="hpr" areaUnit="ha"
```

```
diameterUnit="mm" lengthUnit="cm" volumeUnit="m3" weightUnit="kg" version="2.1"
xmlns="urn:skogforsk:stanford2010">
```

Dasa-file:

```
<HarvestedProduction xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xsi:schemaLocation="urn:skogforsk:stanford2010 HarvestedProduction_V2p1.xsd"
messageType="hpr" areaUnit="ha" diameterUnit="mm" lengthUnit="cm" volumeUnit="m3"
weightUnit="kg" version="2.1" xmlns="urn:skogforsk:stanford2010">
```

JD-file:

```
<HarvestedProduction areaUnit="ha" diameterUnit="mm" lengthUnit="cm" volumeUnit="m3"
weightUnit="kg" version="2.1" messageType="hpr" versionDate="2015-01-16+01:00"
xsi:schemaLocation="urn:skogforsk:stanford2010 HarvestedProduction_V2p1.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="urn:skogforsk:stanford2010">
```

LogMate-file:

```
<HarvestedProduction weightUnit="kg" diameterUnit="mm" volumeUnit="m3" lengthUnit="cm"
areaUnit="ha" messageType="hpr" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:skogforsk:stanford2010 HarvestedProduction_V2p0.xsd"
version="2.0" xmlns="urn:skogforsk:stanford2010">
```

The only manufacturer that has added **xmlns:sfd="urn:skogforsk:stanford2010">** is Ponsse but not in the correct order if you compare with Rule 12.2 in "StanForD_2010_naming_and_design_rulesV1p8.pdf" (see section below). The interpretation of rule 12.2 is that no one has followed the rule correctly. However, it is only in the case of Ponsse it has giving us a problem.

[Rule 12.2] *StanForD 2010 messages SHOULD conform to the following physical layout as applicable:*

```
<!-- ===== XML Declaration===== -->
<?xml version="1.0" encoding="UTF-8"?>
<!-- ===== root element with namespaces declarations ===
-->
root element to include namespace declarations in the
following order :
StanForD 2010 namespace
Default namespace
XMLSchema-instance namespace
Schema location
Content of the message
```

Comments from Juha-Antti Sorsa (2015-05-08)

Question is: do we need namespace prefix "sfd" for StanForD 2010 namespace?

Short answer:

- 1) In schemas, still yes
- 2) in message files, not necessarily

Long answer:

When we started to implement StanForD 2010 schemas and messages the XML software tools were not so advanced as they are today and we had to make some “tricks” to get everything working. The reason why we have defined “sfd” prefix for our default namespace in schemas, was the need to have constraint definitions working. For example we have following definition in fpr-schema:

```
<xsd:unique name="UniqueMachineKey">
  <xsd:selector xpath="sfd:Machine"/>
  <xsd:field xpath="sfd:MachineKey"/>
</xsd:unique>
```

which defines that MachineKey must be unique. There we have used “sfd” prefix for those StanForD 2010 elements. I remember that I “fought” with this issue at the time because I didn’t understand why we had to use those prefixes. Without that prefix schema file was not valid in those early days. But if I now take away those prefixes

```
<xsd:unique name="UniqueMachineKey">
  <xsd:selector xpath="Machine"/>
  <xsd:field xpath="MachineKey"/>
</xsd:unique>
```

schema file is valid! So something has been chanced inside my XML Spy application. However we still need that prefix in schemas because we have defined our own attribute “versionDate” that is included in root element of schema:

```
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  xmlns="urn:skogforsk:stanford2010" xmlns:doc="urn:skogforsk:stanford2010:doc"
  xmlns:sfd="urn:skogforsk:stanford2010"
  targetNamespace="urn:skogforsk:stanford2010" elementFormDefault="qualified"
  attributeFormDefault="unqualified" version="release_3.1" sfd:versionDate="2015-02-06">
```

all the other attributes in that root element belongs to XML Schema namespace and if we omit that “sfd” the schema file is not valid. So we still need that prefix “sfd”.

So what about messages then. When developing the first StanForD2010 version I was not able to provide valid messages if I didn’t have prefixed global root element of the message although we have defined StanforD 2010 as default namespace. For example:

```
<sfd:ForwardedProduction ... xmlns:sfd="urn:skogforsk:stanford2010"
  xmlns="urn:skogforsk:stanford2010">
```

but today valid messages don’t need that prefix any more. So there is no need to include xmlns:sfd="urn:skogforsk:stanford2010" any more:

```
<ForwardedProduction ... xmlns="urn:skogforsk:stanford2010">
```

It was therefore decided that rules 12.2 and 12.3 (StanForD2010_naming_and_design_rulesV1p9.pdf) are updated as follows in order to correspond better with the present implementations. However, it is not

wrong to include the sfd namespace declaration in message files. If there are problems to use the sfd declaration it's a software (xml-tool) problem, not a message problem.

[Rule 12.2] StanForD 2010 messages **SHOULD** conform to the following physical layout as applicable:

```
<!-- ===== XML Declaration===== -->
<?xml version="1.0" encoding="UTF-8"?>
<!-- ===== root element with namespaces declarations ===
-->
root element to include namespace declarations in the
following order :
StanForD 2010 namespace
Default namespace
XMLSchema-instance namespace
Schema location
Content of the message
```

[Rule 12.3] The root element of each StanForD 2010 message **SHOULD** have following namespace declarations and schema location attribute:

```
xmlns:sfd="urn:skogforsk:stanford2010"
xmlns="urn:skogforsk:stanford2010"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance"
xsi:schemaLocation="urn:skogforsk:stanford201
0
```

<URI path to schema file>"

where

~~<version> is version information that format was presented in~~
~~chapter 7.1~~

<URI path to schema file> this is a hint for processor
where to find corresponding schema file of the message.

~~Prefix for StanForD 2010 namespace MUST always be sfd.~~

NAMING CONVENTIONS CONCERNING ENVELOPE

Fredrik Tjernberg, Komatsu, 2015-09-30

Envelopes can be used for a large number of different purposes. Today the only common use is for packaging all types of harvester instruction files (oin/spi/pin). In the near future it may very well be so that it is also used for forwarder instructions (fdi/foi) as well as for the geographical instruction (ogi/shp/jpg/tif). Fredrik raised the relevant question whether we should make it possible to

distinguish between different envelope files through some kind of file naming recommendation.

A similar issue regarding compressed files was handled through rule 2.1:

ZIP DEFLATE algorithm SHOULD be used as standard compression method in StanForD 2010 messages.
A “Ꞥ” SHOULD be added to the file extension of individual StanForD files that are compressed. A compressed hpr-file would those be given the file extension “hprꞤ”

One solution could be to add a rule whereby we state that when using the envelope for the following purposes we should preferably use specific file extensions:

- Harvester instructions (oin/pin/spi) → .hienv or .oine
- Forwarder instructions (foi/fdi) → .fienv or .foie
- Geographical instructions (ogi/shp/jpg/tif/mif etc) → .gienv or .ogie
- Geographical reprots (ogr/shp/jpg/tif/mif etc) → .grenv or .ogre

It was decided to postpone the proposal until next meeting. Komatsu will fine tune the proposal regarding e.g. rules about what types of files are mandatory using the new extensions.

Comments at the meeting

It should be possible to continue using env for any type of file or message.

If a new extension is added the content must be strictly defined (e.g. foie MUST include both foi and fdi).

§ 5. Implementation issues

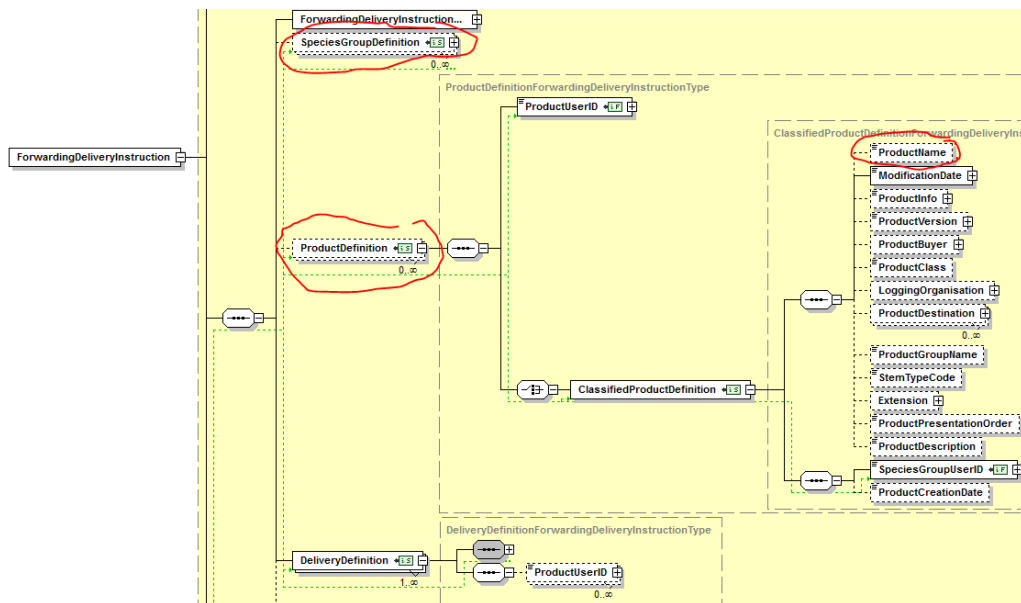
RECOMMENDATION PRODUCTS IN FDI-FILE

Fredrik Tjernberg, Komatsu, 2015-11-04

It has been noted that it is possible to create an fdi-file where the DeliveryDefinition includes a ProductUserID but without including a ProductDefinition and SpeciesGroupDefinition as illustrated below. This means that the file below is valid.

weightUnit	kg		
xmlns:xsi	http://www.w3.org/2001/XMLSchema-instance		
xsi:schemaLoca...	urn:skogforsk:stanford2010 ForwardingDeliveryInstruction_V3p0.xsd		
ForwardingDeliveryInstructionHeader			
SenderApplication			
CreationDate	2015-09-08T14:59:27+03:00		
ModificationDate	2015-09-14T14:28:45+03:00		
ApplicationVersionCreated			
ApplicationVersionModified			
CountryCode			
DeliveryDefinition (9)			
	DeliveryUserID	ModificationDate	ProductUserID
1	SE_1604E_M2570_R003006_Y	2015-10-09T14:03:56+03:00	SE_1604E_M2570_R003006_Y
2	SE_1604E_T6700_R103007S_S	2015-10-09T14:03:56+03:00	SE_1604E_T6700_R103007S_S
3	SE_1604E_T3600_R002001_Y	2015-10-09T14:03:56+03:00	SE_1604E_T3600_R002001_Y

It will be proposed with version 4.0 that the schema is updated in order to make it mandatory to include ProductDefinition and SpeciesGroupDefinition in case ProductUserID is included with the DeliveryDefinition as described in §2.



It is recommended, until we update the standard to version 4.0, that the manufacturers require that ProductDefinition and SpeciesGroupDefinition are included in the fdi-file in order to include these definitions in the fpr-file. This means that references in DeliveryDefinition.ProductUserID is ignored if ProductDefinition and SpeciesGroupDefinition are excluded from the fdi. At least as long as it is not created manually by the operator.

Observe that the definitions included in spi-file and pin-files are only intended for use in a harvester, not for use in the forwarder.

NEW FINNISH FUNCTION FOR BUTTENDPROFILEEXTRAPOLATION

Tapio Räsänen, Metäseho, 2015-10-20

A new spp-file has been developed by LUKE (Natural Resources Institute in Finland). There will be new functions and tables for Scots pine only. Other tree species will stay untouched for time being. With the new function the measured volume of pine stems should be closer to the xylometric/hydrostatic (dipped) volume, i.e. the volume on bark without any air pockets of the bark. The change will be approximately -2.3 % (section below 1.3 m) for trees with d1.3 of 10 cm and -0.7 % for bigger trees with d1.3 of 35 cm according to Luke's studies.

There will, in other words, be a decrease in volume on bark compared to Poikela 2007 and it will be only for the volume below 1,3 m from the cutting (felling point). The big change to Poikela 2007 is that there is only one diameter class, meaning that the form of the butt end is assumed to be similar independent of the tree size. So the decrease in percent is different for different sizes of pines. But

notice that the function is supposed to be used for the volume calculation only and not to register the measured diameters of the butt end, to my understanding.

Luke (Natural Resources Institute) published their new requirements (regulation) regarding the modification of the spp-function 23rd of October. The transition period will be one year meaning that the new functions should be in full use by the end of year 2016. The wish from the industry is that machine manufacturer tests should be carried out as soon as possible, so that there would be new software implemented in the machines already in the beginning of next year. We have an understanding that at least the main machine manufacturers also have good chances to test and implement the functions in a short time.

The new test versions of spi (both 3.0 and 3.1) and old standard spp files has been sent to the machine manufacturers in Finland to be used in their tests. The issue was discussed in the Finnish StanForD meeting on the 5th of November.

Metsäteho had one change proposal before the meeting (later withdrawn):

```
</ButtEndProfileExtrapolationTable>
```

```
<ButtEndProfileExtrapolationFunction ButtEndProfileExtrapolationFunctionCategory="Poikela 2007">
```

```
<!-- Tähän lisäys "Lindblad 2016" -->
```

There was a proposal to add a new enumeration "Lindblad 2016" (based on the fact that the author of the new pine function is Jari Lindblad, Luke).

Below is the table from the LUKE's new measurement regulation. Values 0 – 1,3 are the distances from the cutting. In order to keep the change in machines as simple as possible we have kept the old diameter classes in spi and spp as they are (8 – 45 cm), and the profile values in the tables are the same in each diameter class.

TAULUKKO 2. Männyn tyviprofilikertoimet (‰). D130= läpimitta 1,3 metrin etäisyydellä kaato-leikkauksesta, cm Etäisyys kaatoleikkauksesta (L), m

D130, cm	0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1	1,1	1,2	1,3
8 –	1252	1201	1159	1125	1097	1075	1058	1044	1033	1025	1017	1011	1006	1000

Parameter values of the stem profile function will look much simpler than earlier. Pine = Mänty in the table.

TAULUKKO 1. Puulajikohtaiset parametrien arvot kaavoihin 2–4.

Puulaji	a_{00}	a_{01}	a_{02}	a_{03}	a_{04}
Mänty	5,50	0	0	0	0
Kuusi	30,46	- 3,399	0,181337	- 0,0043459	0,00003908
Lehtipuut	27,04	- 2,004	0,066531	- 0,0007020	0
	a_{10}	a_{11}	a_{12}	a_{13}	
Mänty	7,00	0	0	0	
Kuusi	- 0,35	0,143	0,016430	- 0,0003800	
Lehtipuut	0,41	0,440	- 0,006870	0	
	a_{20}	a_{21}	a_{22}		
Mänty	3,60	0	0		
Kuusi	12,65	- 0,556	0,008019		
Lehtipuut	8,85	- 0,300	0,004027		

The requirement with the old spp has been that it must be in some way hidden and cannot be manipulated by the operators. The requirement was also that spp file should be updateable if there is a need to do that. How this has been handled technically by the manufacturers is unknown. It is assumed that the new parameters cannot be implemented without changing measurement regulations. Therefore forcing the market to use only one spp (old or new) is not an option.

Before the meeting it was suggested that a new enumeration value “Lindblad 2016” is added to attribute ButtEndProfileExtrapolationFunctionCategory. Today the only allowed enumeration is “Poikela 2007”. The proposal was withdrawn by Metsäteho since this element defines the type of function, which is not changed. Instead element SpecieGroupVersion will be used in order to keep track of what parameters have been used.

Comment from Skogforsk:

Since this is a quite new issue to Skogforsk (a couple of weeks ago) we have not been able to analyze the new function for Scots pine on a Swedish data sets. Skogforsk idea is therefore to recommend the use of the old spp-functions on the Swedish markets since there is a general acceptance of these functions. Whether we will start using the new spp-file or not in the future is an open question. We think that this will partly depend on how soon we get the Swedish market to use spi (StanForD2010 instructions).

The conclusion is thus that we expect harvesters on the Swedish market to continue using the older Finnish version of the spp-file.

TIME SCHEDULE FOR IMPLEMENTATION OF STANFORD2010 Harvesters

The following tables and text are to be updated with the minutes::

Manufacturer	Version 2.0	Version 2.1	Version 3.0
Opti (Ponsse)		Q1 2015	Q1 2016 (incl 3.1)
Timbermatic (JohnDeere)		2014 (1.19)	2015, (3.1 2016)
LogMate	Spring 2013		Q4 2014
MaxiXplorer (Komatsu)		Spring 2013	Q1 2015 (3.1 Q1 2016)
Dasa*	Autumn 2014		Q1 2016 (incl. 3.1) OK
Motomit (Parker)			Q3-4 2015 (version 3.1)
DPII (Haglöf)	Spring 2013	Spring 2013	Spring 2013
Silvia7		Spring 2013	May 2014
SDC		December 2013 (hpr) March 2015 (incl hqc)	March 2015 (incl hqc)
WoodForce/ Fifth Element			Q3-Q4 2015. Older formats converted to 3.0. Version 3.1 used from 2016

* A conversion module is available for Dasa4/5 (oin,pin,spi,hpr)

Manufacturer	Present software version released on the market
Opti (Ponsse)	Opti4G version 4.728
Timbermatic (JohnDeere)	1.22
LogMate	1.07.0010
MaxiXplorer (Komatsu)	Unkown
Dasa	1.3
Motomit (Parker)	
DP II (Haglöf)	Skalman V7.12
Silvia7	2015.3.0.0
SenderXC	1.05

Presently the following control systems can update a product, by sending a new pin, during harvesting at a site:

- Dasa
- LogMate

It is not possible to use the updated pin until you start on a new site in:

- Timbermatic (implemented 2016-2017)
- MaxiXplorer (implemented 2016)
- Opti (no implementation is planned but planning is started ☺)
- Motomit(no implementation is planned)

Before the meeting Patrik Anderchen, (Södra) expressed a need to know if ModificationRestricted has been implemented:

- Komatsu, implemented
- JohnDeere, implemented 2016-2017
- Dasa , not implemented
- Ponsse, not implemented
- Motomit, not implemented
- LogMate, implemented 2016

It was also pointed out by Patrik that there is a need for support of pin-files including several products.

Forwarders

The following table for forwarders was compiled at the meeting.

Manufacturer	Version 2.1	Version 3.0
Opti (Ponsse)	All messages implemented if scale is used.	Q1 2016 (incl 3.1)
Timbermatic (JohnDeere)	2014	2015, 3.1 during 2016
MaxiXplorer (Komatsu)	Fpr implemented (other files Q4, 2015)	Fpr Q2 2015 (instructions files Q1, 2016)
Dasa		Q4 2016 (mom and fpr)
Motomit (Parker)		No plans
Silvia7	Fpr implemented.	Fpr implemented
SDC	March 2015 (fpr)	Q4 2015 (fpr)
WoodForce/ Fifth Element		Q3-Q4 2015. Older formats converted to 3.0. Version 3.1 used from 2016

Manufacturer	Present software version released on the market
Opti (Ponsse)	Opti4G version 4.728
Timbermatic (JohnDeere)	1.22
MaxiXplorer (Komatsu)	Unkown
Dasa	No version released
Motomit (Parker)	Unkown
Silvia7	2015.3.0.0
SenderXC	1.05

Operational monitoring

The following table was compiled after the meeting. Please fill in whether mom is implemented for both harvesters and forwarder.

Manufacturer	Version 2.1	Version 3.0
Opti (Ponsse)	Forwarder and harvester ready for test but not released	Forwarder and harvester ready for test but not released
Timbermatic (JohnDeere)	Forwarder (2014) Harvester (2014)	Forwarder (2015) Harvester (2015)
MaxiXplorer (Komatsu)	Forwarder (2014?) Harvester (2014?)	Forwarder ? Harvester ?
Dasa	Harvester (2014) version 2.0	Forwarder (2016) Q4 Harvester (2016) Q1
Motomit (Parker)	?	?
Logmate	Harvester (2013)	Harvester (2014)
Silvia7	Forwarder (2013) Harvester (2013)	Forwarder (2014) Harvester (2014)

Comments

The main remaining obstacles for implementing the new instructions on a wide scale are are:

- Updating product (pin) during harvesting at object
- Sending pin-files (SDC SenderXC)
- Company specific systems for creating oin
- Simple GUI for operator when updating a product (color matrix & quality/button settings). Perhaps a question when replacing product: "Do you want to keep color, quality and cutting window settings?"

It is thus recommended that all manufacturers makes it possible to update a product (pin) during harvesting at object and that GUI for operator is simple when updating a product.

§ 6. StanForD2010 projects

USING STANFORD IN FP SUITE (FP INNOVATIONS)

Jean Plamondon and Martin Castonguay (FPInnovations) presented Canadian forestry in general and more specifically their work on developing a system for monitoring forest machines (FPData/FPCom/FPTrak). The presentation is included in appendix 1. FPDat is an on-board computer that can collect and communicate data from forest machines. Since communication capacity is normally a significant limitation FPDat will generate a very small binary message that can be transmitted using some kind of satellite system (FPCom) to a FPTrak.

FPTrak is a web-based application that can be used visualize both working hours and production data.

The main reason for developing FPDat was that only a small minority of Canadian machines presently has a control system that is StanForD compliant. If StanForD compliant control systems also could generate a very small sized message (binary) and then communicate the data using satellite systems it would be fairly simple to integrate StanForD compliant machines into the FPTrak system.

The proposal to develop a new binary format suitable for satellite communication was discussed at the meeting with some participants being hesitant while other expressing a clear interest in this issue.

Skogforsk and FPIInnovation discussed this issue in more detail day after the meeting. The conclusion was that Martin Castonguay will write a document specifying the present needs regarding format and data content. Skogforsk will thereafter use this document for an open discussion with the manufacturers.

OPERATOR MANUAL FOR CONTROL AND CALIBRATION (SKOGFORSK)

Maria Nordström, Skogforsk, presented the new operator manual for control and calibration of harvesters. All participants were given a copy of the publication which is written in Swedish. The document could be adjusted regarding to the photos if some manufacturers are interested in using for their own purposes. The manual might also be translated into English.

WOODFORCE (METSÄTEHO)

WoodForce web pages www.woodforce.fi have been opened (in Finnish only).

Building and testing of harvesting and silvicultural workforce packages is going on.

StanForD 2010 tests with hpr have been started and will be continued

- spi tests starting as soon as possible
- harvesting pilot-tests is aimed to be achieved in March 2016
- StanForD version 3.1. will be supported in the service
- no decisions yet about ver. 3.2

Training of the users has been started

Minimum requirements for harvester and forwarder equipment (machine computers) have been set earlier. Forest companies will be in contact with the entrepreneurs for updating the devices according to requirements.

HARVESTING QUALITY CONTROL AND SELF-CONTROLLING SYSTEMS (METSÄTEHO)

A new project has started at Metsäteho in order to develop quality management and quality reporting of the operations in harvesting and silviculture. Heikki Ovaskainen is the project manager.

Quality control and reporting is gradually changing from forest companies to contractors to take full responsibility. Development of self-controlling systems are needed to support this. The objective is to develop a pilot quality reporting applications in which the reporting content would be based on automatically generated information and data from forest machine information systems and devices.

The following tasks are included:

- Specification of quality control criteria, variables and measuring principles
- Standardization
- Applications

The objective is to specify a standard for work quality reporting of thinnings

- the standard would make it possible to develop applications for harvesters and to produce comparable information from the operations

Aim is that either in harvesting or forwarding phase the equipment / devices mounted in the machines measure the variables or parameters of work quality and key figures expressing the work quality are calculated already during the work.

In the early development phase with semi-automatic systems also the machine operator can measure certain variables.

Examples of key figures that could be derived out from machine and measuring data:

- average distance between the tracks (strip roads), average track width, amount of track area per hectare, mean variables of remaining stock, number of harvesting damages in remaining trees etc.

SDC IMPLEMENTATIONS OF STANFORD2010

Total number of machines reporting StanForD2010 to SDC today are:

- 100 machines sends hpr
- 60 machines sends hqc

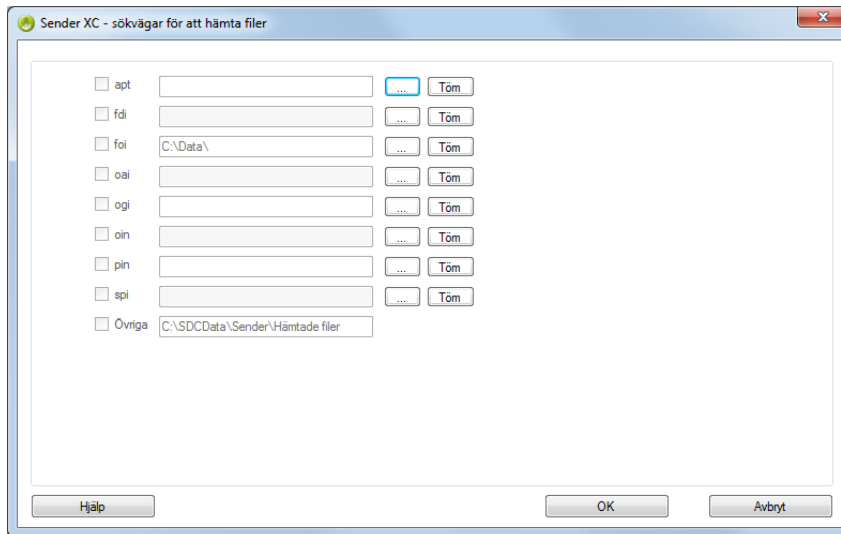
All prl is now converted to fpr at SDC. The old system for prl is closed

SenderXC

New functionality implemented which warns operator if very large files are generated in harvester:

- Maximum size limitation for sending pri and hpr
hpr: 100 MB, pri: 6 MB
- Warning. The file can be send but the user will be asked to change to partial saved files.
hpr: > 60 MB, pri: > 4 MB

Next version of Sender XC is prepared to save files sent to machine in different folders depending on file type. The user can define the path for each file type as illustrated below.



Distribution of instructions (pin) to machine

Final solution not yet decided on. Discussion with customers is on-going about the function and the rules for finding, addressing and sending updated pin to the correct harvesters

PULPWOOD MATRIXES (SKOGFORSK)

A proposal in agenda regarding definition of TopLogFreeBuck was withdrawn before the meeting.

However, there is still some uncertainties regarding how TopLogFreeBuck has been implemented as illustrated by the table below.

	Stan-ForD	Log Mate	Timber-maticH	Ponsse Opti	Maxi Xplorer	Dasa	Motomit
Min top diameter search regardless of length classes in pin-file	Yes	Yes	Yes	Yes	Yes	Yes	?
Price has priority over min top diameter search	No	No	Yes	No	No	?	?
Distribution has priority over min top diameter search	No	No	No	No	No	?	?
"Forbidden to cut" allowed with TopLogFreeBuck active	No	No	No	No	No	?	?
Min top diameter search considered while optimizing logs before last log	No	Yes?	?	?	?	?	?

The open question is whether “minimum top diameter search” (TopLogFreeBuck=true) affects affects logs cut before the last cut. Skogforsk’s recommendation is that TopLogFreeBuck must only affect the last log of a stem.

It is recommended by Skogforsk to use the term “Sök min-diameter för sista bit”/”Min-dia-sök” or “Search for min diameter for last log”/”Min diameter search” in software GUIs where the setting for TopLogFreeBuck is included.

WOOD-VALUE TEST AUTUMN 2016

The objective is to investigate how different bucking computer systems work in practice with StanForD 2010 in order to give:

- Manufacturers support in developing their systems
- Users support when using and buying forest machines

The test will preliminary be done close to Uppsala (up to 60 km) from the middle of September to the middle of November 2016.

The following issues will be covered in the test:

- How bucking instruction with spi, oin, pin works
- How does the optimization and data registration work
 - value, apportionment bucking, pulp wood,
 - hpr, thp, mom....
- Measurement system
 - Length and diameter measurements and volume calculation (single-tree and MTH stems)
 - Functions and support for calibration (hqc)
 - Functions for quality assurance of harvester measurements
- Communication
 - caliper, automatic storing, SDC-communication, etc.
- Administration of data, nomenclature interface
 - saving of data, backup, identities of harvesting objects
- Other important functions implemented
- Probably test of other aspects of wood value (cutting splits, debarking, feeding role defects)

Time table

December 2015

- Invitation to manufacturers to participate in the test

March 2016

- A preliminary test plan

April-May 2016

- Possible to have a web-meeting with Skogforsk and go through the test plan

Practical test from middle of September to middle of November

§ 7 Other issues

No other issues.

§ 8 Next meeting

Web-meeting for confirming version 3.2, 2016-02-04, 13:00 CET

Next ordinary StanForD meeting will start at 12:00, 2016-04-04 in Vantaa and end the following day at 12:00.

§ 9 End of meeting

Johan thanked everyone for their participation.

