

Minutes from the meeting with the StanForD-group 2007-03-27

Place:	Skogforsk, Uppsala, Sweden
Present:	Sakari Suuriniemi, John Deere Perttu Isosaari, Vansco-Electronics Jonas Gustafsson, Sveaskog Per Annemalm, Komatsu Forest Lars Henriksson, SDC Samuli Hujo, Metsäteho Asko Poikela, Metsäteho Klaus Klugmann, KWF Leif Orth, Södra Jon Rudman, LogMax Mikael Eliasson, LogMax Joakim Nygren, Haglöf Johan Bruun, Ponsse Teemu Paldanius, Ponsse Jyrki Partanen, Epec
From Skogforsk:	John Arlinger, Secretary Johan J. Möller, Chairman Linn Burman Petrus Jönsson

§1 Opening of the meeting

Johan J. Möller opened the meeting. The proposed agenda was accepted.

§2 Clarifications and modifications of variables

PRIORITIES IN SPP-FILE

Proposals by Per Annemalm, Komatsu, 2007-01-12

The proposals were based on experiences from implementing the spp-file and on the final official Finnish regulation as decided by the Finnish Ministry of Agriculture and Forestry on 2006-04-18. The spp-file and the variables mentioned below were implemented in StanForD at 2004-03-30 and 2004-10-26.

It was decided that :

1. That the priority of variable 170 type 1 is changed from 1 (Mandatory) to 3 (May be used) for spp-files.
Type of butt end profile extrapolation method is defined in var170_t1 (codes: 0 or no code = machine specific system for extrapolation, 1 = coefficient tables, 2 = function).
2. It should be stated in description of var170_t8, in appendix, that the upper limit of the formula should be 45 cm and not 50 cm, in accordance with the official Finnish regulation. Stems with a DBH above 45 cm should thus use the relative taper of a stem with DBH 45 cm.
3. It should be stated in the description of var170_t8, in appendix, that the lower limit for the formula should be 8 cm, in accordance the official Finnish regulation. Stems with a DBH below 8 cm should thus use the relative taper of a stem with DBH 8 cm.

ALLOWED CHARACTERS IN FILENAMES

Proposal from Metsäteho based on a question from Jari Tyrväinen, Komatsu Forest (January 2007).

The name of the Finnish "official" spp-file is not following the StanForD standard as it includes underscore ("_").

The filename could be changed from "FI_MMM_Asetus_15-06.spp" to "FIMMMASETUS1506.SPP" or the standard could be updated in order to allow basically all characters.

It is today stated in the main document that "permissible characters for filenames are the letters A*Z and the integers 0*9".

The meeting decided to exclude this limitation from the main StanForD document.

PRIORITIES IN DRF-FILE

Drf-files were studied during the harvester test carried out by Skogforsk in November-December 2006 (also called the wood value test 2006). We found some errors and missing variables, each individual manufacturer has been informed of these errors.

It was decided that the priorities of the following variables are updated since they were not included in all collected drf-files during the wood value test 2006 and they have been deemed important for certain analyses:

Var	Description	Present priority	New priority
Var3_t1-2	Machine identities	3,2	1
Var3_t5-6	MCHNNO (base machine)	2	1
Var12_t4	Save date	3	1
Var5_t1	Model variant for the bucking (control system) computer	2	1
Var53	Start date for report interval in time oriented file (data in file normally independent of harvesting objects)	2	1

Var	Description	Present priority	New priority
Var223_t1	Number of harvested stems/operator	3	2
Var228_t2	Number of loads/operator	3	2
Var249_t1-2	Total volume incl unclassified	3	2
Var258_t1-2	Covered distance	0	2
Var320	Short down times	2	1
Var430	Average fuel consumption	3	2
Var441_t9	Transport object description (free text)	2	0

Jörgen Eriksson raised the issue of implementing multi tree handling variables in drf-files prior to last meeting (2006-10-24). The issue was postponed at the last meeting.

It was decided that the following variables are given priority 3 in drf-files:

Var	Name	Type	Data type	Unit	Description
230	NUMBNCH	3	Integer	No	Number of occasion that multi tree handling (several stems delimbed and cross cut simultaneously) is carried out at the site per operator: 1...var211_t2
231	STMSIN-BNCH	3	Integer	No	Number of multi tree handled stems (several stems delimbed and cross cut simultaneously) per operator: 1...var211_t2
246	BUNCHED-VOL	5	Integer	m3 (ob)	Total volume of multi tree handled stems (several stems delimbed and cross cut simultaneously) per operator: 1...var211_t2 The volume is based on the total diameter (diameter measured as if only one stem is processed)
246	BUNCHED-VOL	6	Integer	m3s ob	Total volume of multi tree handled stems (several stems delimbed and cross cut simultaneously) as calculated in harvester per operator: 1...var211_t2
246	BUNCHED-VOL	7	Integer	m3s ub	Total volume of multi tree handled stems (several stems delimbed and cross cut simultaneously) as calculated in harvester per operator: 1...var211_t2

SOUND KNOT FUNCTION VARIABLES

Proposal by Johan Möller, 2007-01-10, based on analyses of stm-files from Skogforsk's harvester test 2006.

At least one manufacturer had implemented the sound knot function based on the assumption that the relevant diameters are under bark. It has not been clearly stated in the specification and variable lists that it should be over bark.

It was therefore decided that the description of var149_t1 is updated so that it is clearly stated that both DBH and sound knot diameter refers to diameter over bark according to the following table (new text underlined):

Var	Name	Type	Data type	Unit	Description
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Var	Name	Type	Data type	Unit	Description
149	FUNCMODE	1	integer	Code	Codes for type of function used when calculating the diameter (<u>ob</u>) of the sound knot limit/cylinder. <u>Observe that all diameters are over bark.</u> 1: $y = (a+bx)*d$ 2: $y = (a + bx + cx2)*d$ Where: y=factor used for calculating diameter (<u>ob</u>) of sound knot limit, x=DBH, a=var147_t1, b=var148_t1, c=var148_t2, d=var148_t3. The default value of d should be 1 if var148_t3 is not used. Diameter (<u>ob</u>) of sound knot cylinder = $y * DBH$ (<u>ob</u>)

It was also discovered during the harvester test that at least one manufacturer is using var281, type 1 and 2 for registering DBH in stm-files.

These variables were suggested in 2001-04-02 but for some unknown reason not implemented. It was decided that the following variables are implemented (according to the suggestion in 2001) with priority 3 in stm-files:

Var	Name	Type	Data type	Unit	Description
281	DBH	1	Integer	Mm	Breast height diameter on bark used in calculation of quality limits, measured value. Height of DBH as specified in var500_t1. Original proposal in Swedish: Brösthöjdsdiameter som använts vid beräkning av kvalitetsgränser, uppmätt värde
281	DBH	2	Integer	Mm	Breast height diameter on bark used in calculation of quality limits, estimated value. Height of DBH as specified in var500_t2. Original proposal in Swedish: Brösthöjdsdiameter som använts vid beräkning av kvalitetsgränser, beräknat värde

It was also decided that var500 (type 1 and 2) is given priority 3 in stm-files.

VOLUME UNITS IN PRL-FIL

Proposal based on a discussion with Pierre Qvist and Lars Henriksson, SDC (2007-01-23)

A value (integer) has to be registered for each and every load code in var447. This may be problematic if a certain volume unit is relevant for certain transport object but not for other transport object. It is, for example, probably not relevant to convert from a loose volume of branches and needle (forest residues) to a top measured log volume or vice versa.

It was decided that -1 is to be used in var447 if a unit in var446 (load codes 401 – 461) is not relevant. This indicates that a certain unit for a certain transport object is of no interest and is left empty (nil).

It was decided to update the description of var447_t1 according to the following table (new text underlined):

Var no	Name	Type	Data type	Unit	Description
447	LOADDATA	1	Integer		Measurement data for each load: 1...var445_t1/1...var443_t1. <u>Observe that -1 is to be used in var447 if a unit in var446 (load codes 401 – 461) is not relevant. This indicates that a certain unit is not used within a certain transport object (nil).</u> <u>Do not mix -1 and values >=0 for a certain volume unit within a certain transport object.</u>

Example:

Both pulp wood and fuel wood (assortment consisting of branches and other residues) are forwarded simultaneously. The relevant unit for pulp wood is m3sub and the unit for fuel wood is m3 loose volume. To convert between these units is of little or no interest and is more or less impossible to do. It is thus better to register -1 for m3 loose volume for pulp wood and -1 for m3sub for fuel wood.

	<u>Load No</u>	<u>Transport object</u>	<u>Unique Id</u>	<u>Green mass, kg (code 450)</u>	<u>Solid volume under bark (code 402 in var446 t1)</u>	<u>Loose volume (code 410 in var446 t1)</u>
Pulp wood	1	1	101	8 500	9	-1
Birch pulp wood	1	2	102	2 500	3	-1
Fuel wood	2	3	201	9 000	-1	13
Pulp wood	3	1	101	10 800	12	-1

§3 New variables

NEW DRF-VARIABLES

SPECTIME and Maintenance

Teemu Paldanius, Ponsse, as well as several users (primarily contractors) have indicated a need for being able to specify Maintenance in a more detailed way. It was suggested (2006-10-24) that it is done in the same way as the specification of "Disturbance" in var330 (SPECTIME). However, as there were some confusion as how to define the causes for maintenance down times it was decided to postpone the issue.

It was decided to update var330 according to the following table (new text underlined):

Var	Name	Type	Data type	Unit	Description
330	SPECTIME	1	integer	Number	Number of specified times per operator: 1...var211
		2	Integer	Code	Type of specified time (10 = Repair, <u>12 = Maintenance</u> , 14 = Disturbance): 1...var330_t1 / 1...var211_t2
		3	Integer	Code	Type of disturbance, maintenance or unit repaired (codes in appendix): 1...var330_t1 / 1...var211_t2
		4	Long integer	Sec	Specified time, the sum of this variable is equal to code 10, <u>code 12</u> and code 14 in var317: 1...var330_t1 / 1...var211_t2
		5	string	Hhhhmss	Specified time, the sum of this variable is equal to code 10, <u>code 12</u> and code 14 in var317: 1...var330_t1 / 1...var211_t2
		6	String	Text	Description, same text as in appendix (var330_t3) to be used: 1...var330_t1 / 1...var211_t2
		9	String	Text	Identity of spare part used in case of reparation, other identity in case of <u>maintenance/disturbance</u> : 1...var330_t1 / 1...var211_t2
		10	String	Yyyymmdd-hhmmss	Time when reparation/ <u>maintenance/disturbance</u> first started: 1...var330_t1 / 1...var211_t2

The decision also means adding the following new codes to var330_t3 (added to appendix), observe that the number of causes has been decreased in comparison to the meeting 2007-10-24:

Codes, causes for maintenance.

Name	Description	Code
Other maintenance / miscellaneous	Not defined	1000
Control and calibration	Control measurement and length/diameter calibration	1100
Saw maintenance	Changing saw chain or saw bar	1200
Refilling and lubrication	Lubrication of machine or refilling of fuel/fungicides/colors etc	1300

A sub division according to the following table might also be possible to implement in the future if deemed necessary (not implemented at meeting 2007-03-27):

Name	Description	Code
Control and calibration		
Control measurement, randomly selected *	Control measurement on randomly selected stem or by third party	1101
Control measurement, operator selected *	Control measurement on operator selected stem	1102
Calibration	Length or diameter calibration (work carried out inside machine)	1103
Saw maintenance		
Saw chain maintenance*	Changing saw chain	1201
Saw bar maintenance*	Changing saw bar	1202
Refilling and lubrication		
Lubrication		1301
Refill fuel/diesel		1301
Refill fungicide		1301
Refill colors		1301

It was also been suggested by Lennart Hult, Sveaskog (2007-03-08) that a new variable is introduced for registering the engine time for each down time registered in var330. It was decided to implement the following new variable with priority 2 in drf-files:

Var	Name	Type	Data type	Unit	Description
330	SPECTIME	11	integer	Hours	Total engine time (covering total life time of the engine when the file is generated) when reparation/maintenance/disturbance first started: 1...var330_t1 / 1...var211_t2

Updating var316_t3

It was discovered during the harvester test (November/December 2006) that some of the manufacturers had misunderstood the specification concerning

the relationship between processing, terrain travel, other work and road travel time. The sum of these times must be equal to Et (code 3 in var316_t3)

It was therefore decided that the present codes 10-13 are updated and that four new codes are added according to the following text:

"10=Processing time (subset of Et), 11=Terrain travel time (subset of Et),
12=Other work time (subset of Et), 13=Road travel time (subset of Et)

20=Processing time (subset of E0), 21=Terrain travel time (subset of E0),
22=Other work time (subset of E0), 23=Road travel time (subset of E0)"

It was also decided that it should be clearly stated in the appendix for var316_t3 that:

"The sum of times registered according to codes 10, 11, 12 and 13 must be equal to E(t), code 3.

The sum of times registered according to codes 20, 21, 22 and 23 must be equal to E0, code 2."

DEFINITION OF CALCULATED VOLUME (VAR299_T5)

Proposal by Tapio Räsänen, Metsäteho, 2007-03-23.

In StanForD meeting 2006-10-24 a new variable var299_t4 was implemented in order to register log volumes based on control measurements. The description of the variable is "Solid volume of logs on bark based on control measurements with caliper, calculated in caliper or in bucking computer: 1...var299_t1". The meeting also decided that a more precise definition of how this volume is to be calculated is needed. This proposal was based on having the description of var299_t4 as it is and defining a new variable for volume calculation method. Var299_t4 remains unchanged with the exception that there is an addition to the description stating that the volume calculation method is defined by var299_t10-11. The proposal was discussed in the Finnish StanForD meeting 2006-11-29.

In theory there are a couple of different formulas for calculating the log volume based on calliper measured diameters. In Finland only cylinder formula is used in practice. Other possible volume calculation formulas are truncated cone, Nilson (Estonian), Huber and Smalian. The idea now is to implement new variables in which the volume calculation method and formula is given as a number code. It is suggested that only cylinder and truncated cone formulas are given specific codes. The methods and formulas are supposed to be described in detail in StanForD Appendix.

Volume of the first one meter part of the butt log is calculated a bit differently from the other logs in the Finnish control measurement system. The volume is based on tables or functions defined in spp file. There are two ways to define this feature in var299. The simplest one would be that in appendix it would be stated whether spp-data is to be used when calculating the volume of butt logs or not. The other way would be to add a few more codes into var299_t5, one for using spp and one for not using spp

It was decided to update and introduce the following variables (new text underlined) with priority 3 in ktr-files:

Var	Name	Type	Data type	Unit	Description
299	LOG-VOL	4	Int	0.0001 m3sob	Solid volume of logs on bark based on <u>manual control (operator)</u> measurements with caliper, calculated in caliper or in bucking computer (calculation method given in var299_t10 and var299_t11): 1...var290_t1 Data used for calculation stored in var291_3, var293_t3, var373_t3, var374_t5 and spp-file (depending on code var299_t11).
<u>299</u>	<u>LOG-VOL</u>	<u>10</u>	<u>Int</u>	<u>Code</u>	<u>Type of volume calculation method used for solid volume of logs on bark based on control measurements with caliper (var299_t4)</u> <u>0 = not defined</u> <u>1 = cylinder formula,</u> <u>2 = truncated cone formula,</u> <u>The formulas are described in StanForD Appendix.</u>
<u>299</u>	<u>LOG-VOL</u>	11	<u>Int</u>	<u>Code</u>	<u>Type of diameters used when calculating butt end (first meter of stem from butt end) solid volume on bark, based on control measurements with caliper (var299_t4)</u> <u>1 = using spp-diameters</u> <u>2 = using machine measured butt diameters or extrapolated diameters</u>

It was also decided to add the following text to the appendix for var299_t10:

Code 1) Formula for a cylinder to be used (Volume = Radius*Radius*Pi*Length).

Diameter values are assumed to be midpoint for each "cylinder section".

Code 2) Formula for truncated cone to be used (Volume = (Pi*Length/3)*(Radius1^2 + Radius1*Radius2 + Radius2^2)).

Volume between two diameter values are calculated using this formula.

Example. Diameter data for a log (not butt end):

Positions (dm)	0	5	15	20
Diameters (dm)	2,4	2,2	2,0	1,8

If cylinder (1) formula is used: $(1,1^2)*\pi*10 + (1,0^2)*\pi*10 =$

If cut cone (2) formula is used: $((\pi*5/3)*(1,2^2 + 1,2*1,1 + 1,1^2) + ((\pi*10/3)*(1,1^2 + 1,1*1,0 + 1,0^2)) + ((\pi*5/3)*(1,0^2 + 1,0*0,9 + 0,9^2))$
=

Observe that what calculation method (cut cone versus cylinder) is most suitable can be dependent on how and where the diameters were measured.

UPDATING KTR-FILE (NEW VARIABLES AND PRIORITIES)

Diameter values in ktr-file

Proposal by Jon Rudman, Log Max, 2006-12-14.

Manual control measurements of diameters are normally carried out with a calliper, measuring two diameters with a 90 degree angle. Presently it is only possible to register one single diameter value in var373 and var291, this means

that only the average diameter is registered in the ktr-file. It would be an advantage to know the diameters of both directions when using data for calibrations as well as when carrying out detailed analyses of diameter deviations.

A clear effect of ovality on the measuring accuracy could be noticed during the harvester tests carried out by Skogforsk during November and December 2006. The following table illustrates the correlation between ovality and mean deviation:

Log ovality classes	0-7 mm	8-15 mm	16-23 mm	24-31 mm
Standard deviation for diameter difference (M1-M2)	3,9 mm	4,9 mm	5,5 mm	7,31 mm

It was therefore decided to implement the following new variables with priority 2 in ktr-files:

Var	Name	Type	Data type	Unit	Description
291	TOPDIAOB	7	Integer	Mm	Manually measured top diameters of logs over bark, first unfiltered diameter value from cross measurement (measured manually by operator, M2): 1...var290_t1
291	TOPDIAOB	8	Integer	Mm	Manually measured top diameters of logs over bark, second unfiltered diameter value from cross measurement (measured manually by operator, M2): 1...var290_t1
291	TOPDIAOB	9	Integer	Mm	Manually measured top diameters of logs over bark, first unfiltered diameter value from cross measurement (measured by auditor, M3): 1...var290_t1
291	TOPDIAOB	10	Integer	Mm	Manually measured top diameters of logs over bark, second unfiltered diameter value from cross measurement (measured by auditor M3): 1...var290_t1
373	CONTDIA	8	Integer	Mm	Manually measured control diameters over bark, first unfiltered diameter value from cross measurement, measured manually by operator (M2): 1...var372_t3/1...var290_t1
373	CONTDIA	9	Integer	Mm	Manually measured control diameters over bark, second unfiltered diameter value from cross measurement, measured manually by operator (M2): 1...var372_t3/1...var290_t1
373	CONTDIA	10	Integer	Mm	Manually measured control diameters over bark, first unfiltered diameter value from cross measurement, measured by auditor (M3): 1...var372_t3/1...var290_t1
373	CONTDIA	11	Integer	Mm	Manually measured control diameters over bark, second unfiltered diameter value from cross measurement, measured by auditor (M3): 1...var372_t3/1...var290_t1

Updating priorities in ktr-data

Suggestions by Skogforsk, based on analyses of ktr- and stm-files from Skogforsk's harvester test 2006 as well as updates of demand specification.

It was decided to update the following priorities in ktr- and stm-files:

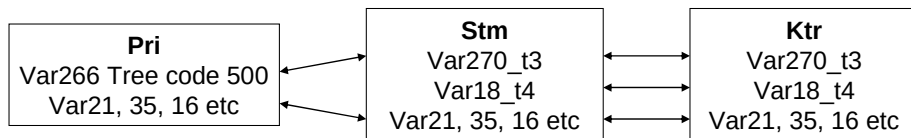
Var no	Name	Type	Description	Priority		
				stm	ktr	pri
3	MCHNNO	1-2	Machine number/id	1	1	
5	VARIANT	1	Version of computer	1	1	
18	CONTRDATE	4	M1 date	1	1	0
18	CONTRDATE	5-6	M2 & M3 date		1	

Var no	Name	Type	Description	Priority		
				stm	ktr	pri
21	SITENO	1-2	Harvesting object	1	1	
21	SITENO	3-4		2	2	
35	CONTRACTNO	1-2	Contractno	1	1	
111	NUMTREESPC	1	No of species	2	2	
116	NOAST	1	No of assortments	2	0	
121	ASSTDESCR	1-6	Assortment descry		0	
232	NUMLOGS	3-4	No of logs/assortment		0	
234	METRERUN	3-4	Metre run/assortment		0	
236	VOLUME	3-4	Volume/assortment		0	
291	TOPDIAOB	5	Top diameter (M1)		2	
291	TOPDIAOB	3, 6	Top diameter (M2, M3)	0	2	
293	LOGLNGTH	5	Log length (M1)	2	2	
293	LOGLNGTH	3, 6	Log length (M2, M3)	0	2	
296	PRICEMATR	2,3	Price matrix data / log		2	
299	LOGVOL	2,3	Log volume / log	2	2	
307	VERFDLNGTH	1	Verified lengths of bolts		0	
361	SAMPLE	1,3,4	Sampling data	2	2	
370	DIAERR	1	Standard deviation, diameter		0	
371	LENGTHERR	1	Standard deviation, length		0	
373	CONTDIA	3,5,7	Control diameters (M1, M2, M3)		2	
374	CONTPOS	5	Control position (M1)		2	
520-523	Coordinates	All	Coordinates	2	2	
211	OPERATOR	1	Name/id	2	2	
211	OPERATOR	2	Number of operators		0	

It was decided to update the following descriptions (new text underlined):

Var	Name	Type	Description
374	CONTPOS	5	Control position for measuring by machine (<u>used instead of var374_t3 if that variable is missing</u>): 1...var372_t5 / 1...var290_t1
290	NUMLOGS	1	Number of logs (sawlogs and pulpwood) <u>for a stem</u>
211	OPERATOR	1	Operator name/id (one operator only in index), <u>repeated for each stem in ktr- and stm-files</u>
38	CONTRMEAS	9	Harvesting time for rejected stems (identical with var12_t4-var18_t4 in stm-file): 1...var38_t7
373	CONTDIA	7	Measured control diameters, <u>unfiltered</u> , measured by auditor: 1...var372_t3 / 1...var290_t1
270	STEMNUM	3	Unique stem identity to be used for all types of stems (<u>according to 38_t5 independently of whether it is a randomly selected stem or not</u>) in both ktr- and stm-files. Not to be modified by operator. Incremented with each harvested stem. Reset when starting at harvesting object.
18	CONTRDATE	4	Measuring date for each stem (date when stem was harvested and measured by harvester, M1-measurement) machine (M1), identical with var12_t4 in stm file. Registered for each stem in ktr file

The following figure illustrates how an individual stem is going to be identified in a pri-, stm- and ktr-file using var18_t4 and var270_t3.



There are a number of variables (var375 -387) that have not been found in any analysed ktr-files. These variables were implemented in the old kau-file ("basis for calibration" sent from calliper to machine) in 1994-11-22 and 1995-06-12 (also complementary document 1995-08-17). It was decided to stop using the kau-file in March 1996. According to Joakim Nygren, Haglöf, these variables have been used in the old computers Dasa 380 and Dapt.

It was decided to give the following variables priority 4 in ktr-files:

VarNo	Name	Unit	Description
375	DIACALPTS	Integer	Number of diameter calibration points/tree species: 1...var111_t1
376	DIACALPTS	mm	Actual machine-measured diameters/ calibration point
377	DIACALPTS	mm	Nominal values of measured diameters/calibration point/tree species: 1...var375_t1/1...var111_t1
378	ACTLNGTH	cm	Actual length/calibration point
379	NOMLNGTH	cm	Nominal length/calibration poin
380	AVRGTRIM	cm	Average butt-log trimming allowance/calibration point.
381	NUMDIAMEAS	Integer	User-definable number of precalibration diameter measurements: Baseline & Breakpoint calibration
382	STDDEV DIA	mm	User-definable standard deviation in diameter
383	STDDEVLNGTH	cm	User-definable standard deviation in length
384	DIAERR	mm	User-definable mean error in diameter
385	LNGTHERR	cm	User-definable mean error in length
386	NUMCALLNGTH	Integer	Number of calibration points for length
387	NUMLNGHT	Integer	User-definable number of precalibration length measurements

§4 Reference coordinates in var522

Proposal by Ola Söderlund, Komatsu, 2007-02-22.

It was pointed out by Ola that it should be clearly stated in var522 that it's primary use is to be a reference point in case coordinates in var523, var266 (pri), var446 (prl) and var441 (prl) are stored as relative values.

It is today problematic that for example it is possible that a pri-file is saved after the harvester have left the harvesting object. Meaning that it should be clearly stated that var522 does not have to be registered when the pri-file is saved for the last time.

It was thus decided to update the description of var522 according to the following table:

Var	Name	Type	Description
522	COORDSTART	1	Latitude when file is created - absolute value, primarily used as reference point in case coordinates in var523, var266, var446 and var441 are stored as relative values, registered according to var521_t2 and var520_t1.
	COORDSTART	2	1=North, 2=South Primarily used as reference point in case coordinates in var523, var266, var446 and var441 are stored as relative values, registered according to var521_t2 and

Var	Name	Type	Description
			<u>var520_t1.</u>
	COORDSTART	3	Longitude when file is created { absolute value, <u>primarily used as reference point in case coordinates in var523, var266, var446 and var441 are stored as relative values,</u> registered according to var521_t2 and var520_t1.
	COORDSTART	4	1=East, 2=West <u>Primarily used as reference point in case coordinates in var523, var266, var446 and var441 are stored as relative values, registered according to var521_t2 and var520_t1.</u>
	COORDSTART	5	Altitude, height above sea level, registered according to var521_t2 and var520_t1. <u>Primarily used as reference point in case coordinates in var523, var266, var446 and var441 are stored as relative values,</u> registered according to var521_t2 and var520_t1.

§5 Centre points in stm-file

The proposal was originally written by Fergal Mohan, TreeMetrics (2006-10-01). The issue was postponed at the meeting 2006-10-24. After that meeting Metsäteho discussed the proposal with some Finnish researchers working on ground based laser scanners. No objections were raised. TreeMetrics is an Irish company developing a ground based laser scanning system that can be used to generate stm-files describing the scanned site.

The basis of the submission was that new scanner techniques are becoming available that will allow the centre points of a stem to be determined accurately at intervals (1 dm) up along the stem. This centre point information will allow any bend or sweep in the stem to be accurately measured. This information can be stored as a set of numbers in a format similar to diameter differences (compare with var273, type 3 and type 4) with the first number the absolute offset from the origin (coordinates in variables 520 – 523) and the following values a snapshot difference from that origin. The absolute offset (the first value) describes the position relative to the origin.

The origin of the plot (where the laser / measuring device is located) can be considered as the reference position which is the same location as the single reference position (GPS-coordinates in var522, sometimes called the starting point). If the GPS coordinates are specified in the stm-file and var521_t1=1 then there should be agreement between the stem position specified in the var523_t1 var523_t3 pair and the centre point absolute values of the stem when the DBH is factored in. Obviously these measurements need to be in the same units and registered to ensure the same coordinate system rotation angle is used in both cases.

So if the offset from the Starting Position to a Stem position specified in the GPS coordinates is converted to X and Y offsets (via an intermediate distance and angle conversion if appropriate) then these values should coincide with the first value for the X and Y coordinates var273_t5 and var273_t6 (see below). If no GPS co-ordinates are specified (var520-523) then the Stem X and Y centre points can be considered relative to a local co-ordinate system.

In theory the centre point is defined as the intersection of 2 diameter measurements made at 90 degrees to each other (comparable with a normal diameter measurement with a calliper). However the centre point is defined as

exactly halfway between the left-most and right-most points on the stem when using a laser scanner.

The X and Y directions describing the position of the centre point are polar coordinates of distance which get recorded (along with the Z coordinate for height) for example during a laser scan. TreeMetrics recommends the scanner begins the scan in a Easterly (X-direction) direction which allows the scan to be plotted on a computer screen with North pointing upwards. So long as the starting compass direction is known the information can be transformed to ensure coordinate system rotation angle is consistent.

It was decided implement the following new variables (with priority 3 in stm-files):

Var	Name	Type	Data type	Unit	Description
273	STEMDIA	5	Integer	Mm	Differential X position of the stem centre point, at heights defined by variable 273_t7. The first value is the absolute offset from the origin and the following values a snapshot difference from the first value. Var522 is the origin/reference point (x,y,z=0,0,0). X and Y centre points can be considered relative to a local co-ordinate system if no GPS co-ordinates are specified (var522).
		6	Integer	Mm	Differential Y position of the stem centre point, at heights defined by variable 273_t7. The first value is the absolute offset from the origin and the following values a snapshot difference from the first position. Var522 is the origin/reference point (x,y,z=0,0,0). X and Y centre points can be considered relative to a local co-ordinate system if no GPS co-ordinates are specified (var522).
		7	Integer	Mm	Differential Z (height) position of the stem centre point. The values should always be a multiple of the interval specified in var269_t2. The first value is the absolute offset from the origin and the following values a snapshot difference from the first position. Var522 is the origin/reference point (x,y,z=0,0,0). X and Y centre points can be considered relative to a local co-ordinate system if no GPS co-ordinates are specified (var522).

Here's an example of how the information would appear in the stm-file

```
273 5 8066 2 -2 2 5 6~
273 6 -2040 -20 -21 -22 -22 -20~
273 7 -660 100 200 300 400 500~
```

The absolute X,Y position of the Stem is 8.066m, -2.040m, away from the origin and -.66m below it (Z position). The next centre point (for the stem profile 10cm up the stem) would be the addition of the snapshot values to the absolute i.e. 8.068m (8066+2), -2.060m (-2040-20), then 8.064m (8066-2), -2.061m (-2040-21) and so on. The advantage of using snapshot differences is that you don't have to work your way through the whole sequence in order to work out any random value.

In order to simplify the parsing of the centre point information the number of centre points stored for each Direction (X,Y and Z) must always be equal (it could be just a single absolute value but this can already be handled with var523_t1, var523_t2, var523_t3, var523_t4). There must be a one-to-one

correspondence between the number of centre points specified in var273, type 5-6.

§6 StanForD 2010 and SDCs papiNet-initiative

Johan Möller presented Skogforsk ideas related to a new updated edition of StanForD (see below). The working name for this project is "StanForD 2010".

Working plan StanForD 2010

1. Create working group – today 2007 03-27
 - All members, Metsäteho and Skogforsk
2. Study of needs and requirements on the next edition 2007
 - users, machine manufacturers, different countries ...
3. Analysis of data content and structures
4. Analysis of technologies
 - Keep the format of today or XML:
Continuation of work from earlier years, papinet
Update knowledge: new technologies and supporting products
 - other studies?
5. Pre-versions of the standard files 2008
 - example files
6. Pilot tests 2008/ 2009
7. Final edition 2009

Objectives for the next edition

1. Files and data structures have to support the data management
 - re-structuring the data hierarchy?
2. Future data needs
 - non-touching measuring, digital images, quality models, energy wood ...
3. Supporting the data management needs of different users
 - machine manufactures
 - forest companies around the world
 - contractors, forest owners, 3rd parties etc.
 - different practices e.g. in wood measuring
easy beginning for the new users – light investments on
software (use of standard office tools)
flexible to use
possible to make user versions of the base-standard?
4. Open interfaces
 - web technologies, mobile communication
 - editors
 - database products, office products

The following person will be contacted for the continuing work on StanForD 2010:

Sakari Suuriniemi, John Deere
Perttu Isosaari, Vansco-Electronics

Per Annemalm, Komatsu Forest
Tapio Räsänen, Metsäteho
Mikael Eliasson, LogMax
Teemu Paldanius, Ponsse
Jörgen Eriksson, Dasa

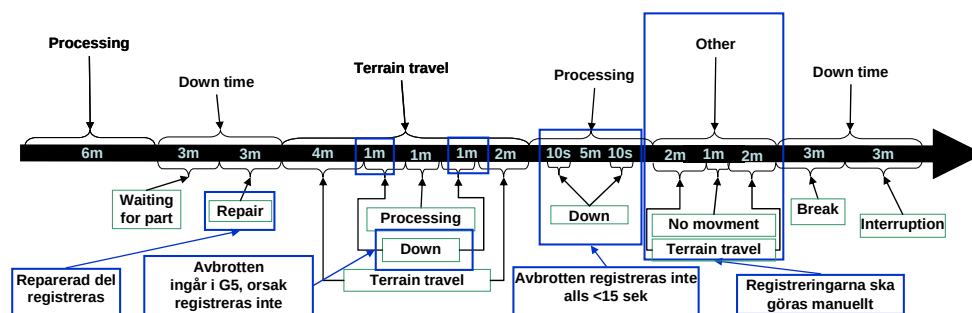
John Arlinger briefly described SDC's initiative to form a work group (Segment Implementation Groups = SIG) within the papiNet standard to cover wood supply.

Presently the idea is not to replace StanForD with papiNet. However some production data will be of large interest for a new papiNet standard.

§7 Items for discussion and information

STUDY OF OPERATIONAL MONITORING SYSTEMS

Petrus Jönsson and Linn Burman, Skogforsk, briefly described the work on evaluating the monitoring systems. A test cycle (figure below) has been defined in order to test the automatic time registration.



The test cycle has been tested on three different machines in order to evaluate present operational monitoring systems. Drf-files has been collected as well as information from the drivers, basically their experience of the systems.

The text cycle will be revised and run again on all modern monitoring systems. The results from the studies will be compared to see if the systems differ from each other. The user interface will be studied in more detail with focus on usability. Some general guidelines for interface design will be published.

DEFINITION OF SOLID VOLUME

There is no exact definition of a solid log volume in StanForD today. As far as the author knows the issue of defining solid volume has not been discussed at all during the history of StanForD while the issue of registering diameter values in var273 was discussed 2001-04-02.

When analysing stm-files from all manufacturers during the "Wood value test 2006" it was noticed that some systematic differences exist when comparing registered log volumes and volumes calculated based on the diameter values registered in var273. Similar differences could also be noticed when calculating log volumes based on var373_t5 and var291_t5 (observe that var373_t5 is a subset of var273).

When discussing the issue of what is registered in var273 and how a solid volume is estimated Skogforsk realized that there are significant differences between the different manufacturers.

This may become an important issue in Sweden in the future when harvester measured volumes are used as a basis for paying the forest owner.

This is not a proposal but rather a basis for starting a discussion. The ideas are based on the assumption that we need to clearly define solid volume as well as what diameters to register in var273.

- *Solid volumes (solid volumes not defined by var161) should always be calculated based on filtered diameter values and the physical length of the log. Filtering means that the diameter is never allowed to increase when going from the butt to the top of a stem. This means that basically the solid volume should be as close as possible to the "true" solid volume as possible assuming that the diameter of a stem never increases when moving along the stem from the butt end towards the top of the stem.*
- *The largest allowed length unit for calculating solid volume is per dm-module. If possible it is suggested that the solid volume is calculated based on the diameter of each cm-module.*
- *The systematic difference between using the formula for a cylinder (average diameter or mid diameter) or a cut cone is not significant (<0.1%), it is thus possible to use either of these formulas.*
- *No systematic difference between the sum of var299_t3 (m3sob per log) and a volume calculated based on filtered diameters from var273 should exist when analysing several stems simultaneously. That is assuming that the diameters in var273 represents the same physical length as the total physical length of all logs in the individual stem.*
- *The diameter values in var273 should represent the minimum diameter of the dm-module below. The diameter at, for example, 400 cm should then represent the lowest measured diameter between 391 and 400 cm. This means that the lowest measured diameter value is always registered for a certain position if the diameter vector is filtered.*
- *Do we need to consider the stem volume that "disappears" in the form of sawdust when registering the diameters in var273?*

The following variables are today used for registering solid volumes:

var202_t2, var202_t3, var235_t3, var235_t4, var236_t5, var236_t6, var236_t7, var236_t8, var236_t10, var236_t11, var241_t1, var241_t2, var241_t3, var241_t4, var241_t5, var241_t6, var244_t1, var244_t2, var244_t3, var244_t4, var244_t7, var244_t8, var249_t1, var249_t2, var249_t3, var249_t4, var249_t5, var249_t6, var299_t2, var299_t3, var299_t4, var329_t12, var329_t13, var504_t1, var504_t2, var504_t3, var504_t4, var532_t1, var532_t2, var532_t3, var532_t4, var544_t1

FINNISH VARIABLE RECOMMENDATIONS, KTR/STI-FILES

Metsäteho has compiled a list describing the Finnish recommendations concerning which variables needed in sti- and ktr-files. It has been sent out to Finnish users and manufacturers. It means that there most certainly will be a proposal at the next meeting.

The meeting discussed the issue of sti versus stm. Based on the Finnish demands the only significant difference will be that var273 is included in stm-files but not in sti-files. When using the stm/sti-file for control measuring the machine measurements are normally extracted from var273 when using stm-files and from var291 and when373 when using sti-file. A major question then is why have two different file types for basically the same information? A suggestion discussed during the meeting was the possibility to include var291 and var373 in the stm-file. This would mean that all today existing information in sti-files also would be included in stm-files and the need for sti-files would thus very limited.

VOLUME OF TREE TOP AND STUMP (FUEL WOOD)

The following idea from Metsäteho concerns the volume of reject top pieces and stumps used for energy purposes. The original idea came from Jari Tyrväinen, Komatsu, during the last Finnish StanForD meeting.

It would be good to have some way of registering the total volume of reject top pieces and stumps per tree species in StanForD files. These volumes are used for energy wood and calculated volume of them could be used in estimating the total volume of residuals after logging. There is a need for at least two new variables with their separate types: one for total volume per tree species in prd and one for the volume of the reject top volume of a stem in stm-file. Function for calculation of the volume of a reject top piece per stem could perhaps be based on the top diameter of the last log and the height point of that diameter (= sum of the log lengths from cutting level to the top of the last log).

Metsäteho will write a proposal for the next meeting.

§8 Other issues

GERMAN "SALES LENGTH" IN PRI-FILE

Klaus Klugmann presented the ideas behind sales length. The issue was also discussed at the last meeting. The conclusion was that it would probably be good if Frank Gleibs at Wahlers Forsttechnik (Ponsse's German seller) took a direct contact with Ponsse in Finland in order to write a complete formal proposal concerning registration of sales length.

§9 Next meeting

Next meeting will take place on Wednesday October 24th, 2007, at Skogforsk in Uppsala, starting at 10.00 a.m. Proposals for the meeting shall be the secretary by hand preferably not later than October 1st 2007.

§10 End of meeting

Johan J Möller (chairman) closed the meeting.

Secretary

John Arlinger