

Timmerleden Forest road Project

D3 Forest Road Management and Maintenace policies

Translated by Hanna Christoffersson











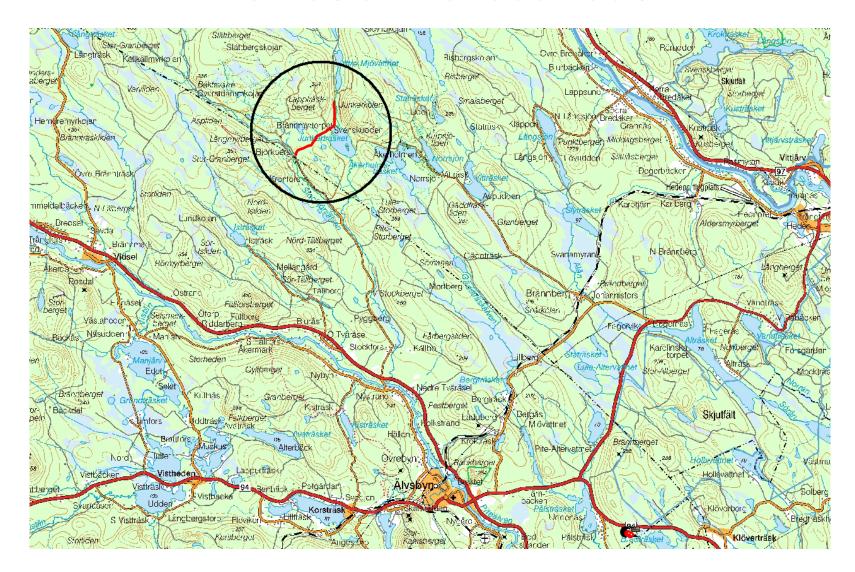


CO₂ Objectives

- <u>Eu vision:</u> -20% CO₂ by 2020
- <u>SCA vision:</u> -20% CO₂ by 2020
- Sveaforest: -30% CO₂ by 2015
- <u>Swedish Forest Agency:</u> the Eu vision, and additionally contribute to sustainable development in community planning and the efficient use of natural resources.



Timmerleden forest road





Project partners

Sveaforest
SCA Forest Company
Swedish Forest Agency
Trafikverket

Project organizers: Per Christoffersson SFA, Donald Engström SCA, Martin Osbäck Sveaforest, Johan Ullberg Trafikverket, Svante Johansson Roadscanner AB



Execution

Sveaforest, SCA Forest AB, and the Swedish Forest Agency (SFA) will each create a rehabilitation plan for the trial route. These plans should focus on the structural thickness of the road.

The result will be compared with a plan prepared by Roadscanners using the ROADEX method.



Execution

Each plan will be prepared using normal practice.

SCA Forest AB, Sveaforest: will drive the stretch of road and make notes for actions necessary in each section.

Equipment: car with a length measuring meter.

<u>SFA:</u> will walk the stretch of road and make notes for actions necessary in each section.

Equipment: Measuring wheel, carpenters`rule, camera and, for some cases, a spade and a skewer for taking samples.



Sveaforest

- Bearing capacity increase of the forest road
- <u>Earlier arrangements:</u>
- In 2005 a bearing improvement was carried out on the entire forest road where a reinforcement layer of about 0-70 was added. A layer of 700 ton per km of road base was laid, thaen a layer of 500/ton per km and finally a wearing layer of 350 ton/km. This resulted in heavy traffic being able to drive all year around.
- Present situation:
- The Forest road cannot take all of the heavy traffic at present, especially on the ROADEX test section. The road must be regraded every 1-2 weeks during the worst of the soil frost thawing. Today there are up to 20 heavy vehicles per day.
- Reinforcement:
- My proposal (Sveaskog AB) is to add a reinforcement layer of 15 cm of 0-50 aggregate, which means (5000*0,15 = 750 m3/km = 1 275 ton/km), or a total <u>Sum</u> of 5 km*1 275 ton = 6375 ton
- Road layer:
- 6cm of 0-30 aggregate (4400*0,06=264 m3/km= 450 ton/km), or a total <u>Sum</u> of 5 km*450 ton = 2250 ton
- Wearing layer:
- 6cm of 0-20 aggregate (4000*0,06= 240 m3/km=408 ton/km), or a total <u>Sum</u> of 5 km*408 ton = 2 040 ton
- The total amount of crushed material totals 10 665 ton on the test section of road.
- Sveaskog AB
- Martin Osbäck



SCA Forest AB

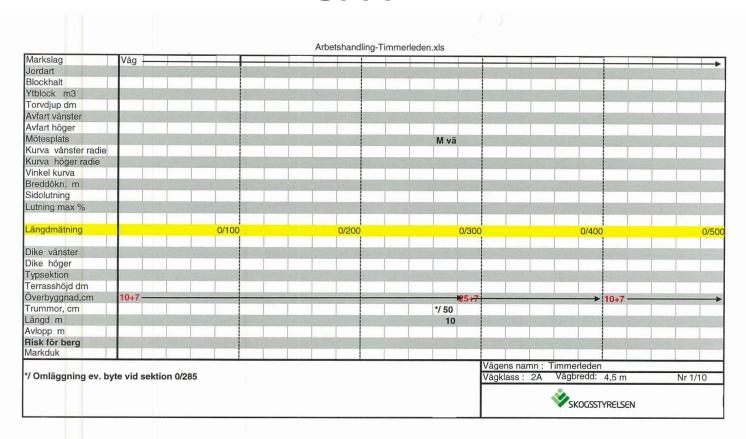
- Proposal of refurbishment by SCA.
- Bush clearance of the entire stretch of road.
- Plane and re-camber the entire stretch of road. Finished road width to be 4,5 m
- Road layer mountain crushings

Length in m: 10 cm 3330 m, 20 cm 1670 m

- 0-800 10 cm 0-30
- 800-1050 20 cm 0-50
- 1050-2140 10 cm 0-30
- 2140-2250 20 cm 0-50
- 2250-2700 10 cm 0-30
- 2700-2810 20 cm 0-50
- 2810-3340 10 cm 0-30
- 3340-4330 20 cm 0-50
- 4330-4790 10 cm 0-30
- 4790-5000 20 cm 0-50
- Ditching or removal of sliproad. Remaining ditching is not nessesary.
- 3610-3630 left side
- 3900-3920 left side
- 4330-4350 left side
- Wearing layer 7 cm 0-18 of the whole stretch of road.



SFA





SFA

```
0/000 - 0/280
               10 cm 0-50
0/280 - 0/400
               25 cm 0-50
0/400 - 0/800
              10 cm 0-50
0/800 - 1/060
              25 cm 0-50
1/060 - 1/150
              10 cm 0-50
1/150 - 1/370
              25 cm 0-50
1/370 - 1/940
               10 cm 0-50
1/940 - 2/080
               25 cm 0-50
2/080 - 2/580
               10 cm 0-50
2/580 - 2/880
              25 cm 0-50
2/880 - 3/270
              10 cm 0-50
3/270 - 3/310
              25 cm 0-50
3/310 - 3/480
              10 cm 0-50
3/480 - 3/570
               25 cm 0-50
3/570 - 5/000
               10 cm 0-50
```

• Length m: 10 cm 3830 m, 25 cm 1170 m



Roadscanners

```
0/000 - 0/278
               10 cm
                           278 m
0/278 - 0/543
               20 cm
                           265 m
0/611 - 0/680
               10 cm
                            69 m
0/680 - 0/740
               20 cm
                            60 m
0/782 - 1/062
               25 cm
                           280 m
1/180 - 1/436
               20 cm
                           256 m
1/436 - 1/492
               10 cm
                            56 m
1/844 - 2/047
               10 cm
                            203 m
2/360 - 2/397
               10 cm
                             37 m
2/506 - 2/636
               10 cm
                            130 m
2/636 - 2/840
               20 cm
                            204 m
2/840 - 2/860
               10 cm
                             20 m
3/240 - 3/280
               10 cm
                             40 m
                            102 m
3/450 - 3/552
               10 cm
3/552 - 3/595
               20 cm
                             42 m
3/595 - 3/659
               10 cm
                             64 m
3/659 - 3/693
               20 cm
                             34 m
3/693 - 3/760
               10 cm
                             67 m
3/760 - 3/922
               20 cm
                            162 m
3/922 - 4/143
               10 cm
                            221 m
4/259 - 4/293
               20 cm
                             34 m
4/293 - 4/390
                             97 m
               10 cm
4/538 - 4/672
               20 cm
                            134 m
```

10 cm = 1518 m 20 cm = 1057 m 25 cm = 280 m

Total = 2855 m av total 4967 m



Dimensionering av överbyggnad

	Sektion	ner																			
	50	100	150	20	00	250	300	350	400	450	500 5	550 (500 6	50	700 7	750 8	800	850	900 9	50 1	1000
Skogsstyrelsen			_	_	_		_	_	- 4	_	_	-		-	-	-	-	_		_	
Slitlager			7					- 25	40	10	40	- 40	10	40	40	- 10-	- 25		- 26	- /	- 21
Bärlager Förstärkningslager	10) 1	.0	10	10	10	25	25	10	10	10	10	10	10	10	10	25	25	25	25	25
SCA Skog AB																					
Slitlager	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Bärlager Förstärkningslager	10) 1	0	10	10	10	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20
Sveaskog AB																					
Slitlager	•	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Bärlager	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Förstärkningslager	15	1	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Roadscanner																					
Slitlager	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Bärlager Förstärkningslager	10) 1	0	10	10	10	20	20	20	20	20		10	10	20		25	25	25	25	25
Stålarmering																					



	Sektion	er																		
az ar centre se dizablec	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750 1	1800	1850 1	900 1	950 2	2000
Skogsstyrelsen Slitlager	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	- 0
Bärlager	25	10	10	25	15	25	10	10	10	10	10	10	10	10	10	10	10	10	25	2!
Förstärkningslager																				
SCA Skog AB																				
Slitlager	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Bärlager	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Förstärkningslager	-																			
Sveaskog AB																				
Slitlager	6			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Bärlager	6	6			6	6 15	6 15	6	6	6	6	6	6	6	6	6	6	6	6	15
Förstärkningslager	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Roadscanner																				
Slitlager	5		5			5	5		5	5	5	5	5	5	5	5	5	5	5	5
Bärlager	25			20	20	20	20	20	10								10	10	10	10



	Sektioner																			
Skogsstyrelsen	2050 2	100	2150	2200	2250	2300	2350	2400	2450 2	2500 2	2550	2600	2650	2700	2750	2800	2850 7	2900 2	950 3	000
Slitlager	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	1
Bärlager	25	10	10	10	10	10	10	10	10	10	10	25	25	25	25	25	25	10	10	10
Förstärkningslager																				
SCA Skog AB																				
Slitlager	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
							4.00		400		40	200	4.00	20	0.0	40	40	10	10	10
Bärlager	10	10	20	20	10	10	10	10	10	10	10	10	10	20	20	10	10	TO	10	10
Bärlager Förstärkningslager	10	10	20	20	10	10	10	10	10	10	10	10	10	20	20	10	10	10	10	10
Förstärkningslager	10	10	20	20	10	10	10	10	10	10	10	10	10	20	20	10	10	10	10	10
Förstärkningslager Sveaskog AB	10	10		3 100				6	6	6	6	6	6	6	6	6	6	6	6	
Förstärkningslager Sveaskog AB Slitlager			6	6	6	6	6													6
	6	6	6	6 6	6 6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6 6 15
Förstärkningslager Sveaskog AB Slitlager Bärlager	6	6	6	6 6	6 6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Förstärkningslager Sveaskog AB Slitlager Bärlager Förstärkningslager	6	6	6 6 15	6 6	6 6	6	6 6 15	6	6	6	6	6	6	6	6	6	6	6	6	6



	Sektioner	3																		
72 0 70 Mark 12 00 1	3050 3	100	3150	3200	3250	3300	3350	3400	3450 3	500 3	3550 3	3600	3650	3700	3750 3	800	3850 3	900 3	950 4	000
skogsstyrelsen Slitlager	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
Bärlager	10	10	10	10	1199	25	10	10	10	25	25	10	10	10	10	10	10	10	10	10
örstärkningslager																				
SCA Skog AB																				
Slitlager	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Bärlager	10	10	10	10	10	10	20	20	20	20	20	20	20	20	20	20	20	20	20	20
0 10 000																				
Sveaskog AB						-				-	•		-		-					
oveaskog AB Slitlager	6	6	6	6	100	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
oveaskog AB Slitlager Särlager	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Förstärkningslager Sveaskog AB Slitlager Bärlager Förstärkningslager		-	-	- 22	6	- 3		- 7	-	470		- 450		- 370	- 3	-	- 3	-	- 3	6
Sveaskog AB Slitlager Bärlager	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6 6 15
öveaskog AB Slitlager Bärlager Förstärkningslager	6	6	6	6	6 15	6 15	6	6	6	6	6	6	6	6	6	6	6	6	6	6



	Sektioner																			
Skogsstyrelsen	4050 4	100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950	5000
Slitlager	7	7	7		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
Bärlager	10	10	10	10) 10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	1
Förstärkningslager																				
SCA Skog AB																				
Slitlager	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	1
Bärlager	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	20	20	20	20) 2
Förstärkningslager	X																			
Sveaskog AB																				
Slitlager	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	. (
Bärlager	6	6	6	. 6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	, (
Förstärkningslager	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	1
Roadscanner																				
Roadscanner Slitlager	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	



Estimated CO₂ in plan

• SFA	5219 m3	29100 kg CO ₂
3. 7. 1	32171113	= 7 . 3 3 . kg 3 kg

•	SCA Forest AB	5085 m3	28300 kg CO ₂
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Sveaforest AB 6750 m3 37600 kg CO₂

Roadscanners 3127 m3 17400 kg CO₂



Result

• SFA 5219 m3

SCA Forest AB 5085 m3

Sveaforest AB 6750 m3

Roadscanners 3127 m3

SFA 521.900 skr

SCA Forest AB 508.500 skr

Sveaforest AB 675.000 skr

Roadscanners 312.270 skr



Cost of preparing the rehabilitation plan

• SFA

1,10 skr/m

SCA Forest AB

0,40 skr/m

Sveaforest AB

0,40 skr/m

Roadscanners

18,0 skr/m



Total cost of preparing the plan and carry out the work

SCA Forest AB

SveaforestAB

Roadscanners

$$5500 + 521.900 = 527.40$$

2000 + 508.500 = 510.500

2000 + 675.000 = 677.000

102 skr/m

135 skr/m

$$90.000 + 402.270 = 492.270$$

97 skr/m



In the future?

- Increase sample- taking
- Increase measurable factors
- Better documentation of current situation

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

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